

CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURAL RESEARCH  
TECHNICAL ADVISORY COMMITTEE AND CGIAR SECRETARIAT

**Report of the**  
**Second External Programme and Management Review**  
**of the**  
**International Centre for Living Aquatic Resources Management**  
**(ICLARM)**

TAC SECRETARIAT  
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

This report comprises:

- (a) Extract from *Summary of Proceedings and Decisions*, CGIAR Mid-Term Meeting 1999, Beijing, China
- (b) Letter from TAC Chairman and CGIAR Executive Secretary, transmitting the Report of the Second External Programme and Management Review
- (c) TAC Commentary on the Second External Programme and Management Review
- (d) ICLARM's response to the Second External Programme and Management Review
- (e) Transmittal letter from Panel Chair to TAC Chair and CGIAR Executive Secretary
- (f) Report of the Second External Programme and Management Review of ICLARM

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**Report of the  
Second External Programme and Management Review  
Of the  
International Centre for Living Aquatic Resources Management  
(ICLARM)**

TAC SECRETARIAT  
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

June 2000



Consultative Group on International Agricultural Research - CGIAR

From: The Secretariat

August 1999

CGIAR Mid-Term Meeting

May 24-28, 1999

Beijing, China

**Report of the Second External Program and Management Review of ICLARM<sup>1</sup>**

At a parallel session chaired by Emmy Simmons, an *ad hoc* committee of interested CGIAR Members and other MTM99 participants discussed the report of the second External Program and Management Review of ICLARM as well as the Center's response and the TAC commentary. The discussion of the review report followed an introduction by Hans Gregersen, Review Panel Chair, the Center response by Board Chair Kurt Peters and Director General Meryl Williams, and the TAC commentary by TAC Member Elias Fereres.

***Highlights of the Committee Discussion***

The *ad hoc* committee:

- Concurred with the overall conclusion of the Review Panel and TAC that the review resulted in a very positive assessment of ICLARM and that the Center has made remarkable progress in all aspects of its work since it was admitted to the CGIAR in 1992 and in particular since the mid-term review of 1995;
- Raised questions about ICLARM's strategy in Africa, the innovative nature of its partnership, the importance of socio-economic aspects in fisheries research, and the crucial role of fisheries for food security. After clarification by the Director General that ICLARM's African strategy is composed of several thrusts, there was consensus that the Center was proceeding on the right track;
- Expressed satisfaction that recent evidence from FAO shows that the fisheries sector in developing countries is even more important than previously considered;
- Commented on ICLARM's contributions to biodiversity research, potential benefits from genetic research, links to the private sector and a broad range of other partners; and

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<sup>1</sup> Extract from *Summary of Proceedings and Decisions – External Program and Management Reviews*, CGIAR Mid-Term Meeting 1999, Beijing, China.



- Strongly supported the proposed move of ICLARM's headquarters to Malaysia and the Center's plans to maintain a research program in the Philippines and close collaboration with NARS.

### ***Conclusions and Recommendations***

The *ad hoc* committee:

- Strongly endorsed the Panel's recommendations and positive assessment of ICLARM, thanking the Panel for an excellent report and ICLARM for its excellent preparations for the review;
- Praised ICLARM's progress since the mid-term review;
- Encouraged continued support of ICLARM's work;
- Endorsed the proposed move to Malaysia and encouraged Members to provide the necessary support and assistance to minimize disruptions to the Center's research programs;
- Emphasized the importance of fisheries research for food security and the environment; and
- Expressed confidence in ICLARM's capacity to meet the challenges of international fisheries research.

The Group endorsed the *ad hoc* committee's conclusions and recommendations.

# **Consultative Group on International Agricultural Research (CGIAR)**

## **TECHNICAL ADVISORY COMMITTEE**

**Donald Winkelman, Chairman**

8 April 1999

Dear Mr. Serageldin,

It is our pleasure to submit to you, for the consideration of the CGIAR, the report of the Second External Review of ICLARM which was conducted by a panel chaired by Hans Gregersen. We also attach ICLARM's response to the review report and the TAC commentary, which summarizes the Committee's reactions to the Panel's report and ICLARM's response. TAC developed its commentary following a detailed discussion of the report with full participation from the Panel chair and ICLARM's Director General and board chair.

We are pleased to note the Panel's conclusion that ICLARM is conducting solid research within a cohesive program that is consistent with CGIAR priorities in living aquatic resources management. The Centre's management is highly effective. TAC applauds management's recent initiation of work on a revised strategic plan and the careful attention given to the move to Malaysia.

TAC notes that the Centre has responded well to all the recommendations made by the 1995 Mid-term Review and is particularly satisfied by ICLARM's strong progress since that Review. Progress in incorporating centre commissioned external reviews as part of its review process is also welcomed.

ICLARM is further developing its programme in the areas of fish genetics, conservation, and health while increasing emphasis on aquatic resources productivity in policy research, economics, and social science research. TAC encourages these steps as well as those being taken in Africa and applauds the sensitivity that ICLARM has demonstrated in dealing with risk assessment in its various dimensions.

The Panel's conclusion that additional resources could be utilized effectively by ICLARM in strengthening international research in living aquatic resources management is a timely one. Recent FAO estimates of the gross value of world fish production suggest a significantly increased importance of this sector, a fact which will be taken into account by TAC in future rounds of priority setting.

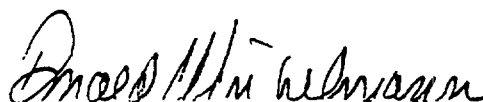
Mr. Ismail Serageldin  
CGIAR Chair  
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In conclusion, we are convinced that ICLARM, as the lead CGIAR Centre in aquatic resources research, offers an excellent opportunity for continued investments by CGIAR Members.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'A. von der Osten', with a long horizontal stroke extending to the left.

Alexander von der Osten  
Executive Secretary, CGIAR

A handwritten signature in black ink, appearing to read 'Donald L. Winkelmann', with a long horizontal stroke extending to the right.

Donald L. Winkelmann  
TAC Chair

## **TAC Commentary on the Second EPMR of ICLARM**

The report of the Second External Programme and Management Review of ICLARM was discussed at TAC 76 in the presence of the Panel Chair, Dr. Hans Gregersen, the Chair of ICLARM's Board, Dr. Kurt Peters, and the Director General of ICLARM, Dr. Meryl Williams. TAC thanks the chair and members of the Panel for its assessment of the Centre, its importance and future role.

TAC endorses, in general, the recommendations of the Panel, and notes that both the Board and Management of ICLARM are in broad agreement with the Panel's findings. However, the Committee would have welcomed more evidence of the Panel's analysis of the strengths and weaknesses of the Centre, in effect, more detail about the Panel's findings. The Committee commends ICLARM for responding positively to the recommendations. TAC offers the following commentary, prepared with inputs from the CGIAR Secretariat, to supplement the Panel's report.

### **Priorities and Strategies**

The Panel's report notes the remarkable progress that the Centre has made since the Mid-Term Review in 1995 and finds that ICLARM is a well-managed research institution with an enhanced capacity for delivery of output and impact. TAC noted with satisfaction the progress made by ICLARM in its current research efforts in Africa in the areas of fish genetics, conservation, fish health, training, and the Malawi project. The Committee encourages the Centre to actively continue its efforts to focus its Abbassa-based programme and supports the attention being given to risk assessment issues related to the introduction of improved fish germplasm in Africa. TAC also supports ICLARM's endeavours in seeking cooperation with WARDA and IITA in West Africa and agrees with the Panel and the Centre that similar modalities for collaboration be explored with ICRAF in Eastern and Southern Africa.

The Committee concurs with the Panel's recommendation that ICLARM ensures appropriate representation on its staff of nationals from West Asian and African countries at its regional site. This should further support development of its programme for the region. Although the Committee understands the caution expressed in the Centre's response, it encourages the Centre to follow the Panel's recommendation.

### **Quality and Relevance of Science**

High quality outputs from the Centre have been developed from research on genetic improvement and from the studies on stock assessment and coastal aquaculture. The global overview of coral reefs is of particular importance. ICLARM's policy research is promising, and TAC encourages the Centre's effort to expand such research in view of the knowledge gap that exists in that area in most developing countries. The Committee agrees with the panel that the integrated aquaculture-agriculture systems programme needs focus by emphasizing research related to the elaboration and testing of approaches to extension and recommends that a more coordinated approach to its various components be promoted.

Extensive discussions with the Board Chair and Senior Management of the Centre led the Committee to concur with the Panel that ICLARM conducts a cohesive research programme of good quality science, including economic, social and anthropological research. For the future, TAC hopes that the Centre will give more attention to reviews of all of its research activities.

The Committee concurs with the Panel's recommendation that systematic reviews of research should be conducted at the various phases in the research process and notes positively the Centre's response describing a set of quality control principles that the Management plans to put into place. In addition, TAC would like to encourage ICLARM to establish standardized procedures for ensuring the quality of science practiced at the Centre. TAC believes these should incorporate Centre Commissioned External Reviews as an integral part.

### **Management and Governance**

TAC notes in the EPMR Panel's overall assessment that ICLARM has a strong and competent management team in place and that management systems have been instituted, which are functioning effectively. The Panel asserts that the Board has performed its oversight and guidance role with due diligence and in the context of excellent policies and procedures that have been put in place. Ten suggestions made by the Panel in addition to the recommendations on management to further improve the Centre's institutional performance were accepted by the Centre. TAC believes that ICLARM is, therefore, well positioned to meet the challenges arising from developing a substantial and responsive programme on living aquatic resources management.

With regard to the limits on staff tenure, the Committee had the opportunity to fully explore with the Centre its views pertaining to this recommendation and was satisfied that ICLARM intends to respond to it constructively. TAC realizes that this poses a problem for career development, as noted by the Panel, but TAC also understands the Centre's viewpoint, which considers its capabilities for offering long-term career paths to scientists. The Committee sensed that, whichever policy is adopted by the Centre, Board and Management will retain sufficient flexibility to be able to make exceptions in situations where the Centre's interest is paramount.

On the Centre's headquarters, TAC notes that a decision has been made by ICLARM's Board at its 75th meeting to relocate the headquarters to Penang, Malaysia, with effect from early 2000. The Committee supports this decision and commends the thorough analysis and the consultative process followed by the Centre in arriving at the final outcome. While ICLARM carefully shaped its preparatory plan for the move, in TAC's view, any change of such magnitude is likely to affect the research performance of the Centre. Accordingly, TAC calls the attention of the Group to the constraints on output that might arise and recommends that the CGIAR should be prepared to assist the Centre in handling unforeseen perturbations that might occur.

### **Conclusions**

TAC is encouraged to see that ICLARM is undertaking a major effort on strategic planning

and is taking the recommendations and suggestions in the Panel's report into account. The Committee is convinced that ICLARM, with its current management and programme, is positioned to take up new challenges in aquatic resources research. This positive development within the Centre and the increased importance of global fish production, apparent in recent FAO estimates, justify the continued investments in fisheries research by ICLARM and the CGIAR.



INTERNATIONAL CENTER FOR LIVING AQUATIC RESOURCES MANAGEMENT,  
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1 March 1999

Dr. Donald L. Winkelmann  
Chairman  
Technical Advisory Committee  
355 East Palace Avenue  
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Dr. Alexander von der Osten  
Executive Secretary, CGIAR  
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701 18<sup>th</sup> Street, NW  
Washington, D.C. 20433  
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Dear Dr. Winkelmann and Dr. von der Osten,

The ICLARM Board and management wish to express their gratitude to Dr Gregersen and all the members of the panel that conducted ICLARM's 2<sup>nd</sup> full External Program and Management Review (EPMR). ICLARM regards this EPMR as a critical milestone in its future development within the CGIAR and greatly appreciates the excellent guidance provided by the Panel and their Review report. It is the Center's first EPMR since it was admitted into the CGIAR. We have been cognizant that the outcomes of the 1992 EPMR were cautious, even to the extent that the EPMR recommended conditional entry of ICLARM to the system. Therefore, we have seen this EPMR as a critical element in the CGIAR assessment of ICLARM's progress and have approached the Review as an open exercise in examining that progress ourselves. ICLARM also highly values the new CGIAR EPMR processes in which the panel not only reviews the Center's performance, impact and strategy but also provides many constructive suggestions and insights for the Center to consider.

Overall, we are pleased that the outcomes of the EPMR are positive and supportive of ICLARM's strategy, its position in and contribution to the CGIAR goals.

ICLARM has gained much from its first years in the CGIAR, and looks forward to increasing its impact on the goals of the system and its ability to work closely with its many partners inside and outside.

Over the last several years, ICLARM has undertaken a comprehensive plan of organizational development designed to improve and enhance the Center's capacity to perform world-class research for living aquatic resource management relevant to low-income people. As a result of growing pressures on aquatic resources, the external needs for such research and the urgent demands for its application have increased over the period. With this in mind and to set the directions for the years ahead, ICLARM's new Strategic Plan is now nearing completion. The EPMR has been a vital input to our planning processes.

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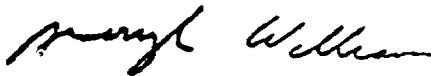
At the end of their intensive and highly productive Review, we note that the panel felt that 'there is strong justification for putting more resources into assuring that the potential contributions of fisheries to human welfare are met in the twenty first century'. ICLARM sees one of its major immediate tasks to be convincing others of the importance of aquatic resources research for the human welfare.

In the process of preparing for the EPMR, ICLARM gathered and prepared materials which will be maintained, enhanced and augmented in future to track the next stages of the Center's development, thereby enabling assessment of the positive responses to this Review.

The Board, management and staff of ICLARM reiterate their appreciation for the work of the Panel undertaking its 2<sup>nd</sup> EPMR. Our thanks also go to the TAC and CGIAR Secretariats for their assistance and support provided during the review. We value the Review report's overall outcomes, its 6 recommendations and the many suggestions. These latter are already having significant impacts on the Center's future directions.

Our responses to each of the 6 recommendations of the Review are given below. The numerous suggestions of the EPMR – all of which are significant and many of which we regard as highly significant – have been considered in detail by the Board and will be integral to the next stage of ICLARM's development.

Sincerely yours,



MERYL J WILLIAMS  
Director General



KURT J PETERS  
Chairman, Board of Trustees



**ICLARM Board and Management Response to the  
Report and Recommendations of the 2<sup>nd</sup> External Program and Management  
Review of ICLARM**

**CHAPTER 2- ICLARM'S PROGRAMS IN RELATION TO ITS MANDATE, MISSION  
AND GOALS**

**Recommendation:**

- 1. The Panel recommends that ICLARM further develop its tactical plan for Africa and West Asia paying attention to the balance between activities that can be carried out at the Regional Headquarters and those that need to be implemented at research sites elsewhere.**

*ICLARM Response:*

Given the importance of the development of the Regional Center for Africa and West Asia and to the expansion of the ICLARM research program into Africa, the Board appreciates the time the Panel took to visit Malawi and Egypt and the attention the Panel gave to the future development of the regional research program. The Board found the analysis and the suggestions for future program development most helpful, particularly the suggestions for the research partnerships and programs, including specific linkages with other CGIAR African activities.

The Board concurs with the recommendation, noting that in its 1996 decision to accept the offer of the Government of Egypt, the Board specifically stated that the facility would be used both as hub for ICLARM's collaborative research and training activities in SubSaharan Africa and WANA regions and as a site for selected upstream research into ecoregional and global topics.

Program development will be given greater priority now that the management transition phase and the renovation of the facilities have been basically finished. We agree that the Abbassa Center cannot meet all of the needs of SubSaharan Africa and that other research sites as well as close association with NARS and other agencies and networks working in SSA will be required. Steps will be intensified in this direction, e.g. plans are being developed for training African scientists in aquaculture genetics at Abbassa, while the research will be undertaken in their countries in SubSaharan Africa through networking.

**Recommendation:**

2. The Panel recommends that steps be taken to ensure representation from other African and West Asian countries on the research and training staff of the Regional Headquarters for Africa and West Asia as a priority.

*ICLARM Response:*

The Board welcomes this recommendation and the further suggestion by the panel for increasing regional expertise by opening the center for visiting scientists. This Recommendation will be implemented with careful consideration for the broader issues related to staffing across ICLARM as a whole. The only constraint will be the level of total ICLARM funding.

### **CHAPTER 3 – CENTER-WIDE PROGRAMMATIC THEMES**

**Recommendation:**

3. The Panel recommends that ICLARM establish explicit mechanisms for external review of the quality of its research at the various phases of its projects. Such review mechanisms should be indicated in project proposals.

*ICLARM Response:*

The Panel's report confirms that ICLARM has in place adequate review procedures and controls during project formulation and research execution. The Board therefore interprets that the weight of this recommendation is focussed on assuring that similar review functions be in place for the outputs of ICLARM's programs, that the three levels of review are specified at the time of project development and that all of these are processes are well integrated into a comprehensive quality control process. The Board concurs with this recommendation. With respect to product quality control, ICLARM has used external Beta testing of institute software quite widely and senior scientists often submit their journal papers to peer review as a matter of course. ICLARM is conscious that, to fulfil its role in providing international public goods, quality control procedures should be ensured for the conduct and outputs of every major project and many forms of policy advice. ICLARM will continue to rely on journal reviewers for purely scientific outputs in the recognized scientific literature. On other outputs, the Center will seek to define the types and estimate the quantity of each type of output and develop policies and external review systems appropriate to each. A comprehensive and integrated system of quality control principles and processes will then be described and implemented as part of ICLARM's normal work program practices.

## Chapter 4 – GOVERNANCE AND MANAGEMENT

### Recommendation:

4. The Panel recommends that the Board develop an alternative policy to the ten-year limit on staff tenure taking into account the particular needs of the Center.

### *ICLARM Response:*

The Board understands the concerns being expressed by the Panel and therefore will be re-examining the Center's policies on the employment of internationally recruited staff. In so doing, the Board will take into account the following factors: the Center's needs; the profile and skills match between a staff member's and the Center's needs; the continuing and comparative advantage in maintaining certain skills (including the possibility of using sources of supply outside the Center); the contribution of the staff member with respect to performance and contributions to the institution and its culture.

As a CGIAR institution, and as a small Center with limited numbers of senior research positions and with largely short term funds commitments, ICLARM can never provide tenured positions nor long career paths for internationally recruited staff. The Board will discuss alternative mechanisms to fixed maximum-term rules and will consider the procedures and timing of introducing the new policies.

### Recommendation:

5. The Panel recommends that the ICLARM Board and Management place the highest priority on locating and transitioning to a permanent headquarters site that meets ICLARM's criteria.

### *ICLARM Response:*

At the time of the EPMR final report, the Board was in the final stage of making a decision on the appropriate site and of evaluating two possible options. The Board recognizes that the successful transition to a new and better headquarters site is one of the biggest challenges facing the Center in this, its 22<sup>nd</sup> year. The Center's ability to attract the best staff, including international and senior staff with center-wide responsibilities, as well as local staff, is intrinsically linked to the headquarters location. In addition, the headquarters seat has significant long-term effect on operational costs, efficiency and effectiveness.

At its 15<sup>th</sup> Meeting, immediately following the EPMR Panel's visit, and following a carefully structured and considered process, carried out over more than 6 years, the ICLARM Board of Trustees decided to pursue the offer from the Government of Malaysia, to locate its global headquarters in Penang. The Board noted that the EPMR commended the Board on the objective and thorough approach taken to select an appropriate site.

The process for selecting a new headquarters site had been based on considerations of the impacts on costs, staff and operations including communications and transport links to the site, the facilities available on the site, site set-up, transition costs and long term operating costs. Penang is considered to offer the Center significant advantages on all these fronts. The Center had been seeking a site at which it could establish modern office, meeting and laboratory facilities.

At the same time as re-establishing its global headquarters, ICLARM will be forming a program of work in the Philippines to continue the country-specific projects and activities which are in train and to develop new global research and training activities in partnership with its many Philippine collaborators. The seat of the program has yet to be decided. The Philippine Department of Agriculture and the Center see many opportunities to combine in a new spirit of partnership to benefit the Philippines and other countries of the region in aquatic resources management, including, locally, in the policy field.

In addition, a small number of ICLARM's existing projects will remain behind in the Philippines in the short term so as not to disrupt their final stages.

## CHAPTER 5 – ICLARM INTO THE 21ST CENTURY

### Recommendation:

6. The Panel recommends that ICLARM (1) continue on the path it is on, deviating to new themes only as a complement to its current activity, (2) seek additional resources to capitalize on new advances in science that create significant potentials for breakthroughs in living aquatic resources management.

### *ICLARM Response:*

The Board welcomes the Panel's encouragement in its mission to conduct key LARM research and related activities for the benefit of poor people and the aquatic environments on which they and many others depend. ICLARM will continue to balance the research and development issues highlighted by the Panel in Chapter 5. ICLARM intends to continue to seek expanded support for the high priority research being presently conducted and as set out in the institute plans for the immediate and longer term future. ICLARM is already embracing, especially in collaboration with other providers, new genetic, computing and information technologies, but as a response to this recommendation will be to intensify its efforts to focus and catalyze the appropriate utilization of new technologies on its mandated research area for the benefit of ICLARM's clients.

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**UNIVERSITY OF MINNESOTA**  
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11 February, 1999

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Technical Advisory Committee/CGIAR  
355 East Palace Avenue  
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Mr. Alexander von der Osten  
Executive Secretary  
CGIAR  
The World Bank  
1818 H. St. N.W.  
Washington, D.C. 20433, USA

Dear Don and Alexander,

I am pleased to submit to you the report of the Panel that conducted the Second External Program and Management Review of ICLARM. In carrying out the review, the Panel considered carefully the terms of reference given to us, focusing on a thorough review of the Center's mission, strategy and priorities; the quality and relevance of its science and other program activities; the effectiveness and efficiency of management of the center; and the accomplishments and impacts of ICLARM.

This is the second full EPMR of the Center. The 1995 Mid Term Review concluded that the Center had responded well to the recommendations of the first EPMR in 1992; and the present EPMR Panel concludes that ICLARM has responded well to the recommendations made by the MTR. Indeed, it has gone beyond these recommendations to create the conditions for future progress.

The Panel's assessment of the Center in the context of the themes set forth in the Terms of Reference led to positive conclusions overall. Thus,

- ICLARM's mission, priorities, goals and strategy are consistent with those of the CGIAR and adequately reflect (1) how the center contributes to the goals of the CGIAR; (2) the key issues in living aquatic resources management needing research,

as identified by the CGIAR; and (3) the research and related activities actually undertaken by the Center.

- The quality of ICLARM's programs and the science on which they are based was judged by the Panel to be good. This conclusion is backed up generally by the results of the CCERs and donor reviews that have been carried out for research programs since the MTR. The Panel also concluded that ICLARM has in place the main mechanisms needed to ensure quality, planning, monitoring and evaluation of programs, although further work on these mechanisms would benefit the center. Details of this conclusion are provided in Section 2 of the report.
- Given the recent discussions in TAC and the CGIAR, the Panel paid special attention to ICLARM's Regional Headquarters for Africa and West Asia, and the Abbassa facilities in that context. It should be noted that the Panel approached this subject taking as given the decision in 1995 for ICLARM to accept the offer of the Government of Egypt. The Panel assumes that these regional activities will continue to be funded from restricted sources.
- The Board was judged to be working well and providing ICLARM with the necessary oversight and guidance. The Director General and her senior management team were deemed to be highly effective. No major management problems were identified, although a number of suggestions are made on how the Center can further improve its management and administration.
- A major decision faced by the Center is choice of a new headquarters site and the planning for an effective and efficient transition to that new site. The Panel fully recognizes, as does ICLARM, the importance of this decision and the consequent planning that will need to be done. The Panel commends ICLARM for already having devoted considerable effort to developing a transition plan and understanding the implications in terms of resource requirements.

The Panel concluded its work with a broader consideration of the future of living aquatic resources management research. The Panel noted the availability of recent FAO estimates of the global value of living aquatic resources products that put this value several orders of magnitude above the estimate used in the most recent TAC Priorities and Strategies document. It considers that, given this difference, TAC may wish to revisit the balance of resources allocated to the fisheries sector in terms of the overall CGIAR priorities. The Panel concluded that additional resources could productively be utilized by ICLARM in strengthening international research on living aquatic resources management.

I would like to thank the members of the Panel for their outstanding contributions in the conduct of this review. They worked hard from the beginning, providing drafts between the first and main phases, and participating actively in the field visits and the lengthy

discussions during the main phase. Also, of special note is the positive way in which ICLARM provided support to the EPMP process. The quality of the documentation, presentations by staff and management, and interactions with them as well as with the Board, greatly facilitated the Panel's work. Finally, I would like to recognize the excellent support received from the TAC and CGIAR Secretariats.

I look forward to interacting with TAC and the CGIAR on the report of the Panel.

Sincerely,

A handwritten signature in black ink, appearing to read 'Hans', written in a cursive style.

Hans M. Gregersen  
Panel Chair

**THE CONSULTATIVE GROUP ON INTERNATIONAL AGRICULTURAL RESEARCH  
TECHNICAL ADVISORY COMMITTEE AND CGIAR SECRETARIAT**

**REPORT OF THE  
SECOND EXTERNAL PROGRAMME AND MANAGEMENT REVIEW  
OF THE  
INTERNATIONAL CENTER FOR LIVING AQUATIC RESOURCES MANAGEMENT  
(ICLARM)**

**Panel:**

Hans Gregersen (Chair)  
Doris Capistrano  
Loke-Ming Chou  
Cecil Machena  
Julie Noolan  
Robin Welcomme

Pammi Sachdeva (CGIAR Secretariat)  
Guido Gryseels (Panel Secretary, TAC Secretariat)

**TAC SECRETARIAT  
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS**

**February 1999**



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## SUMMARY AND RECOMMENDATIONS

ICLARM is now at a key point in its evolution. The problems of the past are past; a strong administration and corporate services are in place; a solid, cohesive research and outreach program has evolved that addresses the priority areas of the CGIAR in living aquatic resources management (LARM) and has had noticable impact on management practice and policy; close linkages exist with key partners in ICLARM's mandate regions, and a solid field program is developing in Africa. The center is about to make a decision on a move to a new headquarters site with appropriate research facilities (which have been sorely missing in the present overcrowded urban site). In sum, the Panel is encouraged by where ICLARM is today and particularly how well it has handled its evolution over the past years.

The Center represents an excellent, solid investment for its donors; and the recognition of the importance of the Center's work is reflected in the steady growth in support, from some \$8 million in 1995, at the time of the Mid term Review, to some \$12 million today. Yet, significantly, ICLARM still remains one of the smallest CGIAR centers - less than one third the size of the largest ones. Also significant from the Panel's perspective is the admirable, structured way in which ICLARM has accommodated and adjusted to its growth. The Panel believes that ICLARM can deal effectively with substantial additional growth; and that such expansion in research would be well justified in terms of the relative importance of aquatic products in food security and in poverty alleviation for many millions of poor living on and near coastal areas of the developing world. Further, ICLARM could make important additional contributions to marine area protection and management and to the overall international processes of conservation initiated under the Convention on Biological Diversity.

To understand the Panel's positive assessment of ICLARM today, one has to go back some years and look at (a) its tremendous progress between the the first EPMR in 1992 and the Mid Term Review (MTR) in 1995, and (b) its additional progress since then and up to the present EPMR. The result of this perspective review of the dynamics of ICLARM results in the Panel's positive conclusion on how far the center has come over the past five years. The MTR report concluded that the Center had responded well to the recommendations of the first EPMR in 1992. The present EPMR Panel concludes that ICLARM has responded well to the recommendations made by the MTR, and, indeed, has gone beyond these recommendations to create the conditions for future progress.

The Panel places great confidence in the staff, management and board of ICLARM. The Center is administered admirably by an experienced executive management team, headed by a thoughtful and competent DG, Dr. Meryl Williams. She has put in place a top group of people with good experience. At the level of research programs - the backbone of the center, ICLARM's programs are operated by a group well qualified, respected scientists. The ICLARM Board is a dedicated and concerned group with a balance of backgrounds that fit ICLARM's needs. The Board has maintained the spirit, enthusiasm and quality of work introduced by Dr. John Dillon, the former board chair (who came in after ICLARM's earlier internal crisis to turn the center around).

The Panel's overall message thus is very positive. No significant problems remain from the earlier internal crisis. At the same time, there are challenges that remain for ICLARM, two of which are the decision on and implementation of a headquarters move, and the consolidation of program activities at the Abbassa regional headquarters for Africa and West Asia. The Panel is satisfied that ICLARM is approaching both challenges in a constructive and positive fashion, and satisfactory results are anticipated in both cases. There also are many small changes, both on the program and the management fronts, that could be made to increase even further the effectiveness of the contributions

of the Center to advances in living aquatic resource management (LARM) and to internal cohesion in ICLARM. Such changes are detailed in the Report.

On the program side, the Panel was pleased with the results of activities and progress since the MTR. ICLARM is making progress in developing a comprehensive, realistic and transparent set of mechanisms for priority setting, program planning and monitoring, and research quality control. The need for further development of such a mechanisms still remains, but the basic units are in place.

The Panel, using the available Center Commissioned External Reviews, donor commissioned reviews, and its own assessment of individual programs, concluded that the Center's programs are performing well, both in terms of impacts and quality of research. ICLARM has moved from a limited number of technical topics to broadly based, socially relevant work involving integration of the biophysical and social sciences. Some specific suggestions for change in emphasis and approach are provided in the body of the report for individual programs. None of these suggestions imply Panel concerns. Rather they represent Panel conclusions on how improvements could be accomplished.

The Panel notes and strongly supports the intentions of ICLARM to rationalize and consolidate its nine programs into a smaller, more coherent set of interacting programs. It believes that, as part of this process, ICLARM needs to develop some operational strategy statements on thematic topics that fit in more than one program and detail how these themes best can be reconciled across such programs. Two areas were put forth as examples - aquaculture and social and policy sciences.

With regard to ICLARM's growing program in Africa, the Panel visited the Abbassa site and ICLARM's field site in Malawi, reviewed available documentation and had discussions with key African and West Asian stakeholders and personnel at headquarters. The Panel concludes that ICLARM's program for Africa is progressing, but that it needs further refinement and definition, particularly in terms of developing satisfactory operational mechanisms for integrating the work at Abbassa with that in the rest of Africa and in the Center at large.

The Panel considers that ICLARM is making steady progress in developing mechanisms for the dissemination and incorporation of the results of its research into national and regional programs. The Center also is working with an increasingly larger pool of international and national collaborators to leverage its own resources and to place itself at the center of current initiatives for research dealing with living aquatic resources management.

ICLARM is undertaking a major strategic planning exercise to position itself for the future. This process involves an iterative process of successive approximations of the priorities for ICLARM research as envisioned by the Center itself, its existing and potential partners, and the donor community that has to fund the activities. ICLARM reaffirmed its mandate regions, looked at aquatic resource system issues within them, and then linked these issues with the potentials for contributions of living aquatic resource management to ICLARM and the CGIAR's goals - poverty alleviation, food security, and environmental protection. The process is on-going, and the results will place ICLARM in a solid position to operationally chart its future directions and activities and to create the partnerships that will let it leverage its resources to achieve maximum benefits for the investments made.

The Panel revisited the broader context within which living aquatic resources management research, and specifically ICLARM's activities, are taking place. That contextual review focused on the actual and potential contributions of living aquatic resources to poverty alleviation, food security and environmental stability and enhancement. Based on this assessment, and looking at the current estimates of the economic contributions of living aquatic resources on a global basis - estimates that are much higher than those used by TAC in its last Priorities and Strategies exercise - the Panel concludes that there is ample justification for a significant increase in support for research on living aquatic resources management research.

Following is a list of Panel recommendations:

- The Panel recommends that ICLARM further develop its tactical plan for Africa and West Asia paying attention to the balance between activities that can be carried out at the Regional Headquarters and those that need to be implemented at research sites elsewhere. (Section 2.5.4)
- The Panel recommends that steps be taken to ensure representation from other African and West Asian countries on the research and training staff of the Regional Headquarters for Africa and West Asia as a priority. (Section 2.5.4)
- The Panel recommends that ICLARM establish explicit mechanisms for external review of the quality of its research at the various phases of its projects. Such review mechanisms should be indicated in project proposals. (Section 3.3.2)
- The Panel recommends that the Board develop an alternative policy to the ten-year limit on staff tenure, taking into account the particular needs of the Center. (Section 4.4.2.3)
- The Panel recommends that the ICLARM Board and Management place the highest priority on locating and transitioning to a permanent headquarters site that meets ICLARM's criteria. (Section 4.7)
- The Panel recommends that ICLARM (1) continue on the path it is on, deviating to new themes only as a complement to its current activity, (2) seek additional resources to capitalize on new advances in science that create significant potentials for breakthroughs in living aquatic resources management. (Chapter 5)

# CHAPTER 1 – INTRODUCTION

## 1.1 Need for International Research on Living Aquatic Resources Management<sup>1</sup>

About 70% of the earth's surface is covered with water which provides the natural habitat for living aquatic resources. About one billion people derive their main source of animal protein from aquatic products. Nearly a quarter of the developing country population lives within 60 km from the coast and in Southeast Asia, this share is even 70%. These figures do not include an estimate for the hundreds of millions of poor living near rivers and lakes. It has been estimated that 51% of the population of developing countries lives within a watershed. Total production of aquatic commodities amounts to 129 million tonnes annually of which 73% is from capture fisheries, 20% from culture fisheries and 7% from aquatic plants. In developing countries alone nearly 20 million families depend directly on fisheries and aquaculture for their livelihood. With postharvest marketing and handling included, this number increases to 50 million. The gross value of world fish production in 1996 was estimated by FAO to amount to nearly US\$132 billion a year, of which \$85 billion is from capture fishery and \$47 billion from aquaculture production. Nearly 70% of that production comes from developing countries. Asia accounts for well over two thirds of developing country production. It is important to note also that by 1996, 82% of the world's total finfish, shellfish and aquatic plant production through aquaculture originated from low income food deficit countries (LIFDC).

Per capita fish consumption currently amounts to 9 kg in developing countries and 29 kg in developed countries. By the year 2010 the projected demand for fish amounts to between 140 and 150 million tonnes, which compares to current production of 95 million tonnes through capture fisheries, and 25 million tonnes through aquaculture. As the limits have been reached of what can be produced in a sustainable manner through capture fisheries, the shortfall will have to be provided by an expansion of fish production through aquaculture. The share of aquaculture in global fishery production has already increased from 8% to 22% between 1984 and 1996, and continues to grow rapidly.

Over the last decade, the fast growth in demand for fish, fueled by an expanding population together with a higher demand per capita due to income rises, has led to rapid increases in the price of fish. Furthermore, productivity in many fishing areas is steadily decreasing due to the over-exploitation of many fish stocks, pollution (more than 75% of it land based) and destruction of coral reefs.

Present patterns of exploitation of aquatic resources are not sustainable. There is, therefore, an urgent need for research that focuses on (i) sustainability of natural stocks, (ii) increase in aquaculture, (iii) promotion of biodiversity and (iv) improvements of fisheries management, with the aim of reducing poverty and enhancing food security and equity. In developing countries, the resource base for fish is poorly understood and most national research systems are very rudimentary. Compared to the global research system for agriculture, development of international, regional and national research systems for fisheries is still in its infancy.

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<sup>1</sup> The main data source for this section is FAO and the Panel benefited substantially from background work undertaken by ICLARM for its strategic planning exercise. A list of specific references is provided at the end of this Chapter.



## 1.2 Distinctive Characteristics of Fisheries Research Management

Some features of fisheries distinguish this sector from the crop, livestock and forestry sectors. Fisheries consists of two major components, capture fisheries, which involves extraction of fish from natural stocks in fresh and marine waters, and culture fisheries, in which the product depends on manipulation of the stocks by breeding and feeding.

### a) *The dependence on wild resources*

By far the greater proportion of fish (70%) currently comes from capture fisheries which exploit wild living aquatic resources in natural habitats. Most fish stocks in both inland and marine waters are at maximum exploitation, over exploited or depleted. This means that they are producing less fish than they should and the biodiversity may be seriously threatened. Rehabilitation of these stocks requires a concerted scientific and political commitment to the sustainable management of stocks. Wild fish stocks in rivers, lakes and the sea consist of twenty five thousand species. As it is impossible to study and manage each species individually, generalized and collective approaches have to be adopted.

### b) *The effect of the environment on living aquatic resources*

A distinctive feature of wild fish stocks is their sensitivity to changes in the environment. Certain human activities (particularly polluting ones) have a negative impact on capture fisheries. Such impacts are severe throughout the world and are seriously eroding the potential for fish production. Impacts are maximal in lakes, rivers and coastal zones. In planning the development and management of fisheries, emphasis has to be given to integrated approaches. Fishery managers must also negotiate and formulate policies that take into account environmental conditions in which fish survive.

### c) *Knowledge gaps in fisheries and the environment*

Improved management can only be carried out on the basis of knowledge of the fish and their ecology, and an understanding of how they are affected by fisheries and the impact of other water users. At present, there are enormous gaps in the knowledge of living aquatic resources, which need to be filled through the acquisition and interpretation of natural resources data. Furthermore, management of aquatic resources is subject to a considerable degree of uncertainty due to the dynamic nature of the environment.

### d) *The balance between exploitation and conservation*

Following the UNCED process, the Convention on Biological Diversity, and the FAO Code of Conduct on Responsible Fisheries, perceptions are changing rapidly with regard to the use of natural aquatic resources. Increasing numbers of governments are shifting from exploitation- to conservation-based policies including precautionary approaches. At the same time, there is an increasing emphasis on devolution of management from central government to local authorities or even the fishers themselves through co-management. The future of fisheries depends on policies that allow the human communities to have resource rights and to participate fully in decision making as far as fisheries management is concerned.

e) *The recent development of aquaculture*

Production from aquaculture is expanding and diversifying rapidly. Since 1986, aquaculture has been growing at the extraordinary rate of 8.8% per year on average, compared to only 0.7% for capture fisheries and 3% for livestock production. Three finfish groups—carps, salmonids and tilapia account for most of aquaculture production and for 82% of finfish production. Although much is made of the ancient origins of the sector, modern aquaculture, based on controlled artificial breeding, is only about thirty years old. It was only after the introduction of artificial breeding techniques that there has been some degree of control over the cultured organisms needed for systematic breeding. The selective breeding of strains and varieties for geographically specific characteristics, growth, disease resistance or cold tolerance, is a new activity compared to the centuries of effort devoted to domestic animals and plants. Genetic engineering has recently been introduced in fish breeding also. As in the future much greater use will be made of this tool, precautions are required to guard against environmental risks.

These factors condition the nature of the research needed for the sustainable management of aquatic resources and the scope of the programmes adopted by ICLARM. The Center needs to deal with aquatic resource management (e.g., capture fisheries) as well as with the aquatic resources themselves (e.g., through aquaculture dealing with species selection, biodiversity, sustainability, nutrition, health, etc.).

### 1.3 Origin and Evolution

ICLARM started its operations in 1977 through the support of the Rockefeller Foundation. The Center was admitted into the CGIAR in 1992 following the expansion of the CGIAR to incorporate explicitly natural resources management concerns. As a condition to joining the System, ICLARM had to develop a Strategic Plan, which subsequently provided the basis for the development of its first medium-term plan for the CGIAR covering the period 1994-98. It is important to note also that the CGIAR specifically agreed to support research on inland and coastal area fisheries. The CGIAR would not support research on deep sea capture fisheries or capital intensive aquaculture as sectors of the industry dominated by large scale commercial operators which were outside the CGIAR's mission.

The Center's first external programme and management review (EPMR) was carried out during 1992, also as a condition to enter the CGIAR. The Center was at that time faced with the challenge of transformation from a somewhat fragmented, donor-driven, developmental research organization to a strategic research center that was integrated and client oriented, with a holistic view and a high scientific repute. The 1992 EPMR made a number of recommendations on how to improve ICLARM's management and governance, increase the quality of its research programme, and develop institutional cohesion. The following year ICLARM experienced a major crisis when several programme leaders expressed a lack of confidence in senior management. Consequently, both the Director General and the Board Chair resigned. A new Board Chair, who had a lot of prior experience in CGIAR Boards, John Dillon, was appointed. The late Larry Stifel, who had also served as Chair of the 1992 EPMR, took over as interim Director General until the appointment in 1994 of Meryl Williams as Director General. A process of reform was initiated and a number of center-commissioned external reviews (CCERs) of ICLARM's programmes and management services were organized. Measures were taken to increase the effectiveness of the Center's governance and management, and to enhance the capacity for and quality of research.

A Mid-Term Review of ICLARM, commissioned by TAC and the CGIAR Secretariat, was undertaken in 1995 to monitor the implementation of the 1992 EPMR recommendations, to assess the Center's capacity to realize an effective research programme, and to evaluate progress in improving its programme and management. The Panel conducting the Review conveyed a positive message, expressing confidence in ICLARM's future and recognising that the Center had gone a long way towards implementing nearly all of the 1992 recommendations.

Since its entry into the CGIAR, ICLARM has made great progress but also had to face several challenges. These refer to the development of a strategic research agenda and of a medium term plan, reorganisation of structure and management, and locating a Headquarters site. As reported in the 1995 MTR, the Center also faced a number of difficult personnel issues. During 1996, ICLARM accepted an offer from the Government of Egypt for a comprehensive set of research facilities to serve as a regional site for the conduct of research targeted at the Africa and West Asia Region.

In recent years, there have also been major developments in the CGIAR which had substantial implications for ICLARM. The 1995 Lucerne Declaration called for greater priority to be given in the CGIAR to research on aquatic resources. New financing arrangements came into play in the CGIAR which encouraged entrepreneurship in center fund raising but which also led to a greater share of funding being provided as restricted funding rather than as unrestricted core. The CGIAR also embarked on the introduction of project-based research management to enhance accountability, promote multidisciplinary, strengthen impact assessment and an output orientation of research, and to facilitate priority setting. All of these developments had major consequences for ICLARM's work and the way it conducted its operations.

#### **1.4 ICLARM Response to the Mid-Term Review**

The Panel that conducted the 1995 Medium Term Review (MTR) made 8 recommendations of which 6 were directed to ICLARM, and the remaining 2 to TAC and the CGIAR. The recommendations and ICLARM's response to these, as well as some additional comments from the Panel, are found in Appendix III. The Panel is fully satisfied that ICLARM has adequately followed up and implemented the MTR recommendations. With respect to the recommendations directed to TAC and the CGIAR, the Panel notes that the resources available to ICLARM have expanded considerably between 1995 and 1998, but that the Center still falls short on the resources it needs to implement the Medium Term Plan endorsed by the Group.

#### **1.5 ICLARM Today**

ICLARM as an institution has grown from merely a handful of close-knit personnel with a portfolio of 3 projects at its headquarters site in the Philippines 20 years back, to over 300 staff worldwide and 9 fully fledged programs and 13 CGIAR projects today.

ICLARM's commitment is to improve the well being and livelihood of present and future generations of poor people in developing countries through undertaking, facilitating and disseminating scientific research to improve the production, management and conservation of aquatic resources such as fish.

More specifically, ICLARM strives to:

- improve the biological, socioeconomic and institutional management mechanisms for sustainable use of aquatic resource systems ;
- devise and improve production systems that will provide increasing yet sustainable yields and;
- help develop the capacity of national partners to ensure sustainable development of aquatic resources.

ICLARM today is a center with a 1998 budget of about US\$12.6 million and a staff of over 300 people, including 28 internationally recruited staff. It is located in rudimentary office facilities in the heart of Metro Manila. ICLARM has field stations and collaborative research activities in Bangladesh, the Solomon Islands, the Caribbean, Malawi, and a regional headquarters facility for Africa and West Asia in Egypt. The Center also has extensive collaborative research activities using facilities of its partners in the Philippines, China, Vietnam, Thailand, India, Indonesia, Sri Lanka, Fiji, Malaysia, Ghana, Taiwan, and Côte d'Ivoire. Regional training activities have been conducted in many countries of the Asia-Pacific and sub-Saharan Africa regions.

ICLARM's activities are organized in nine programs as follows:

1. Aquatic Environments (AEP)
2. Biodiversity and Genetic Resources (BGRP)
3. Coastal Aquaculture and Stock Enhancement (CASEP)
4. Fisheries Resources Assessment and Management (FRAMP)
5. Germplasm Enhancement and Breeding (GEBP)
6. Information and Training (ITP)
7. Integrated Aquaculture-Agriculture Systems (IAASP)
8. International Partnerships and Networks (IPN)
9. Policy Research and Impact Assessment (PRIAP)

ICLARM's current (1999-2001) MTP is an update of the plan for the period 1998-2000 and is based on an extensive consultative development process undertaken in 1996 and 1997 which prioritised the institute's activities for the forthcoming three to five year period. Changes in the current plan are therefore the result of progress with projects in 1997, further projections for research accomplishments in 2001 and the anticipated availability of donor support for the period. The plan describes research and research-associated activities organized in 17 projects amounting to a total of US\$14.5 million in 1999. This is US\$1.85 million less than the earlier Medium Term Plan (MTP) submission of US\$16.35 million for the first year of activities and reflects both a more modest rate of expansion suggested by TAC and the current level of support for ICLARM in 1997/98.

Currently ICLARM is in the process of revising its Strategic Plan for the period 2000-2020, which will also provide the basis for its 2001-2003 Medium Term Plan.

As discussed in Chapter 2, ICLARM's research program over the Plan period continues to give approximately equal weight to biophysical research on both capture fisheries and aquaculture with increasing emphasis on socio-economic and policy research. The program blends biological and social science with state of the art communications technologies to provide outputs on resource management issues of use to a wide range of clients, from fishing families to aquatic resources research scientists, extensionists and policy makers.

Currently ICLARM allocates 31% of its resources to activities related to increasing productivity (13% to germplasm enhancement and breeding and 18% to improving production systems), 17% to protecting the environment, 13% to biodiversity, 20% to policy, and 19% to strengthening NARS.

ICLARM is currently in the process to:

- (i) consolidate its existing research portfolio and programme structure to develop globally relevant strategic research methods and technologies in the identified resource systems and will concentrate more applied research and development activities on the poorer nations of Asia and the Pacific;
- (ii) use unrestricted funds and seek additional support for wider activities in genetic enhancement of important aquaculture species, and a socio-economic evaluation of the uptake of integrated aquaculture/agriculture technologies by poor rural farmers, methods for the improved management of developing country coastal fisheries, and strengthen capacity for assessing the impact of ICLARM-derived aquatic resources technologies and for conducting relevant policy research, including environmental economics of key resource systems; and
- (iii) develop its new hub for Africa and West Asia in Egypt and initiate concurrent research programs focused on fish health, the conservation of aquatic biodiversity and the sustainable use of inland waters of the region.

In terms of its research program, ICLARM has focused on three main resource systems: coastal inshore systems; coral reefs; and farmponds and rice floodwaters. In its draft strategic plan it is proposed to expand this focus slightly to deal with additional freshwater systems, namely, lakes, small waterbodies and floodplains.

In terms of research approaches and partnering, ICLARM's focus has widened over the years. It now attempts:

- to integrate relevant knowledge from disciplines such as demography, economics, sociology, environmental science, governance and more, in addition to biology and technology;
- to expand links with partners in many developed and developing countries as well as with the farming and fishing communities themselves;
- to work in regions other than Asia Pacific, i.e., Africa and the Caribbean;
- to recognize the global significance of its task;
- to be constantly aware of the impact of its work on ecosystems and the environment; and
- to keep the poor people who get their nutrition and earn their livelihood from fisheries at the top of the list of priorities.

Beyond the 1993 crisis, ICLARM now has developed into a dynamic organization with a core group of strongly motivated scientists with internationally recognized expertise and substantial experience in aquaculture and coastal fisheries. The Center has developed a wide set of inter-institutional linkages, and can count on strong goodwill and support from national programs and other fisheries organizations. The Center has improved its governance through institution of various systems that ensure a smoother flow of communications, better accountability mechanisms and an improved set of management procedures, policies and processes. Since the MTR, ICLARM has recruited a DDG for Programs, an ADG for Corporate Services, a Director of International Relations and a DDG for Africa and West Asia. All are highly experienced and have solid reputations.

An overview of the transformation process that ICLARM has gone through since 1993 is presented in Box 1.1. The box was prepared by ICLARM as background material for the Panel. The right hand column should be seen as the goals to which ICLARM is striving. The Panel considers that ICLARM has made great progress in achieving these goals and reports on this progress in the Chapters that follow.

**Box 1.1 Transformation Process at ICLARM**

<b><i>TRANSFORMED FROM AN ICLARM WITH.....</i></b>	<b><i>TO AN ICLARM WITH.....</i></b>
a weakly defined mandate established on the basis of the available funds and the strengths of key individuals	<b>a well articulated mission and mandate which lead to its work program, demonstrates a great concern for the ultimate beneficiaries and which permits space for scientific creativity and growth</b>
ad hoc planning, accountability and assessment processes for its work program	<b>well established and critically reviewed processes for planning, assessing research adoption rates and the impacts of adoption</b>
pioneer stage, even ad hoc and weak administration and management processes	<b>efficient and effective corporate and technical support services, fair and strong management processes and strong staff appreciation of the services</b>
Informal and often only personal linkages to research collaborators, donors and stakeholders	<b>many healthy, strong and productive partnerships and stakeholder relationships incorporated into its organizational fabric</b>
generally weak and partisan donor support	<b>Stable, firm donor support, and more diversified funding sources, including more non-CGIAR sources</b>
a fragmented senior management	<b>strong executive and senior management teams with a strong sense of corporate responsibility</b>
uneven performance and contributions of staff (national and international)	<b>support and encouragement to all staff to contribute fully</b>
little public profile though some scientific profile	<b>a respected voice in global aquatic research affairs</b>

Source: ICLARM

Through the years, ICLARM has built up the support and abilities of its strategic aquatic research and management partners worldwide. Indeed, ICLARM views itself as operating principally in the partnership mode, an approach that both leverages its resources and provides an effective vehicle for capacity strengthening in NARs and other groups with which it works. Over the years, ICLARM has collaborated on undertakings with over 300 institutions.

A key problem faced by ICLARM today is its headquarters site and the need to move into a new and better headquarters facility that would include, among other things, limited research facilities. In the current headquarters, there are only offices and a few meeting rooms. The Panel comments on this issue in greater detail in section 4.7.

## **1.6 ICLARM and the CGIAR**

ICLARM is the only CGIAR Center mandated with research on aquatic resources and fisheries. In fact, it is the only international research center dealing with this subject. While since the 1995 MTR, the CGIAR and TAC feel very confident with the workings and research of ICLARM, the Center still faces considerable challenges in trying to get "out of the shadow" of its big brothers on agriculture in the CGIAR. During 1997, fisheries research accounted for only 3% of CGIAR resources, compared to 71% for crops, 14% for livestock and 12% for forest research. During 1998 and 1999 this share is expected to rise to 4% in line with TAC's recommendation. TAC (except for one member between 1993 and 1997) and other CGIAR Committees do not have specific fisheries expertise. The recently undertaken System Review of the CGIAR gives very little attention to fisheries research.

The regional associations of NARS that interact with the CGIAR do not have members from the fisheries community. Furthermore, national fisheries research systems are mostly of limited capacity, and much greater efforts are required in developing national capacities, research methodologies and databases than in the traditional fields of agriculture.

The only other major international organization dealing with fisheries is FAO. FAO and ICLARM have excellent working relations and collaborate closely.

## **1.7 Conduct of the Review**

The Panel started its work with the initial phase, which was conducted at ICLARM, Manila, from 21-27 September. During this period, the Panel attended two days of presentations on the Center's programmes and management, met with key senior staff, held internal discussions and visited field sites and key collaborators of ICLARM in the Philippines. The Panel Chair and one Panel member also attended the Center's Board of Trustees meeting from 28 September to 3 October and had individual interviews with all Board members. Originally Panel members were supposed to visit ICLARM's work in other countries, but such plans had to be postponed due to floods in Bangladesh and the unexpected cancellation of flights to the Solomon Islands. The Panel also conducted a survey of ICLARM staff, both at headquarters and in field sites regarding their perceptions and concerns.

In conducting the review, the Panel took the timing of the 1995 Medium Term Review as its starting point as it was considered at that time that the recommendations of the 1992 EPMP had all been implemented.

The Panel Chair attended ICW98, and took the opportunity to speak to the main ICLARM donors and stakeholders. He also visited FAO. As customary in EPMP's, members of the CGIAR were given an opportunity to submit to the Panel any major issues with respect to ICLARM that they would like to be addressed by the Panel.

En route to the main phase, conducted at ICLARM, Manila, from 31 January to 12 February, members of the Panel undertook field trips to Malawi, Egypt and the Solomon Islands, where they visited ICLARM's activities and met with national collaborators.

During the main phase, the Panel met with a large number of ICLARM's professional and support staff, with representatives of the host country, and with institutional partners and collaborators of ICLARM in the Philippines. The Panel regularly met with senior management, as did the Panel Chair with the Director General to discuss progress. ICLARM's management received a draft of the report for comments, particularly on errors of fact, before it was finalized. On the last day of the review, the Panel Chair presented the report to staff, management and the Board Chair of ICLARM.

The composition of the Panel and biographic detail of its Chair and members is provided in Appendix I. The Terms of Reference of EPMRs are attached in Appendix II.

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## **CHAPTER 2 –ICLARM's PROGRAMS IN RELATION TO ITS MANDATE, MISSION AND GOALS**

### **2.1 Planning and Priority Setting**

ICLARM uses a number of considerations in setting priorities for its programmatic responses to the mounting challenges in aquaculture and fisheries. The process begins with a recognition of the mission and goals of the CGIAR and the commitment and objectives of ICLARM. These two considerations collectively set the overall context for analysis and decision making. Within that framework ICLARM sets its priorities and develops its planning processes, which currently involve several levels of planning. For the long-term (20 years), ICLARM is preparing a new Strategic Plan. For the medium term (3 years), ICLARM prepares the three-year rolling MTP required of all centers. At the operational level, in accordance with the MTP, are program and project plans and budgets which are presented in the annual Operational Plan. The present section looks at the strategic and medium term aspects of ICLARM's planning.

#### **2.1.1 Strategic Planning**

At the time of the current review, ICLARM is in the process of preparing its strategic plan for 2000-2020. The first draft of the plan was submitted to the Board at its September 1998 meeting and a revised draft will be submitted at the February 1999 meeting. The document has been circulated to over a hundred collaborators, both internal and external, for comment. In its present form the draft is rich in information and is supported by technical annexes of the various geographical areas and aquatic resource systems with which ICLARM is involved. It sets out ICLARM's competence and proposed future direction. It also defines the major priorities for action by area, ecosystem and discipline. It is a work in progress; and the substance undoubtedly will be modified on the basis of the comments yet to be received. As such, rather than commenting in detail on the substance of the strategic plan, the Panel focused on the process being followed and on the major directions indicated in the draft plan.

Basically, the process followed by ICLARM was a variation of the classical Delphi process. Results of the initial round of consultations were synthesized and consolidated, and submitted to the stakeholders for further rounds of discussion and consolidation. This iterative process of successive approximations continued until there was general agreement among the stakeholders and an inclusive set of priorities had been identified that recognized ICLARM's comparative strengths and abilities and the means available to it. The final stage involved synthesis by the Center, supported by an expert panel. The process of refinement with the Board continues, although the major thrusts of the strategy have been firmed up.

Regional focus of ICLARM will remain primarily on Asia, with a significant buildup of activity planned for Africa. These regional priorities do not differ from those adopted in the 1992 Strategic Plan. At that time, and again in the current process, the Board considered such factors as where the majority of the poor who depend on aquatic resources live, and potential for contribution from ICLARM's research. The main reason for focus on Asia is the dominant position of the region globally in terms of aquaculture activity, total aquatic product consumption, and large numbers of poor fisherfolk who could benefit from ICLARM's work. The main reason for increased focus on Africa in the current plan is the potential for future contributions of ICLARM's work. ICLARM's focus in Africa is expected to be on integrated aquaculture in ponds, and on integrated management in small water bodies, reservoirs and lakes, coastal zones, and coral reefs.

Superimposed on the broad regional foci, and at the heart of the priority setting process previously used by ICLARM, and now proposed for the strategic plan, is the evaluation of problems and research opportunities *within aquatic resource systems*. ICLARM examines 8 different aquatic resource systems: (1) ponds, (2) reservoirs and lakes, (3) streams, rivers and floodplains, (4) coastal waters, including estuaries and lagoons, (5) coral reefs, (6) soft-bottom shelves, (7) upwelling shelves, and (8) open oceans. It considers poverty alleviation potentials and environmental enhancement needs associated with each. A new thrust also considers coastal watershed issues in a broader context.

ICLARM's conclusions, coming out of its strategic planning work so far, give top global priorities in terms of resource systems to: a) estuaries, lagoons (which include mangroves), b) coral reefs and c) farmers ponds. However, within any particular region, a different set of priorities arises, such as in Africa, where lakes and reservoirs receive higher priority. In addition, ICLARM recognizes the special needs of some resource system/regional combinations such as the small island developing states (of the Pacific, Indian and Atlantic oceans) that have and can in the future benefit significantly from ICLARM's work. They effectively cover several resource system types.

A more complete picture of the priority given to the various resource systems in terms of regions is indicated in Table 2.1.

**Table 2.1. ICLARM'S PRIORITY RESEARCH THRUSTS (2000-2020) BY AQUATIC RESOURCE SYSTEM AND GEOGRAPHICAL LOCATION**

S. No.	AQUATIC RESOURCE SYSTEM	PRIORITY STATUS	RESEARCH THRUSTS	GEOGRAPHICAL LOCATION
1.	Ponds	Very high	Introduction of integrated aquaculture systems and impact analysis; genetic enhancement techniques	Asia, Sub-Saharan Africa (SSA)
2.	Small water bodies, reservoirs and lakes	Medium	Develop knowledge base; enhance productivity; integrate management	SSA
3.	Floodplains, streams and rivers	High	Enhance yields; develop appropriate research methods and data to evaluate the resources and improve policy decisions and institutional framework.	Mekong Basin, South Asia
4.	Coastal waters (including estuaries and lagoons)	High	Co-management of coastal and fisheries resources; planning for integrated resource use; introduction of sustainable coastal aquaculture and stock enhancement.	South East Asia (including Mekong Basin), SSA, SIDS.
5.	Coral reefs	Very high	Integration of data on coral reefs to determine parameters of reef health; better management within the ICZM context; sustainable exploitation of coral reef resources through aquaculture and marine protected areas (MPAs).	SIDS (Pacific, Caribbean), South East Asia, East Africa.
6.	Soft bottom shelves	Medium	Analysis of policy implications of changes in coastal fisheries.	Asia, Africa.
7.	Upwelling shelves	Low	Watching brief on productivity and influences of catch on trade and other aquaculture development.	-
8.	Open oceans	Low	Monitor world catch statistics and trade	-

### 2.1.2 Panel's Assessment of Strategic Planning

ICLARM's strategic priorities are by necessity based on expert judgement more than quantitative analysis, given that data on poverty incidence, sustainability issues and environmental degradation by resource systems on global and regional bases are scarce or non-existent (the gaps are significant). In addition, for the data that are available, the overlaps and gaps are substantial. However, ICLARM has put together an analysis as detailed as is possible using available information. The Panel concurs with the basic conclusions reached by the Center, based on its analysis of various sources of information on poverty, environment and productivity potentials for aquatic resources. It notes that:

- 1) there are significant numbers of poor people in developing countries associated with resource systems 1 to 5 (see Table 2.1); and that all of them support substantial numbers of poor people in developing countries;
- 2) ponds, reservoirs/lakes, coral reefs, and small water bodies have a high potential for increases in productivity, mainly through aquaculture;
- 3) all resource systems are under threat of environmental deterioration and losing valuable productivity unless better managed; and
- 4) poor people associated with each of the resource systems will in general benefit more from aquatic resource research results when the research is targeted specifically to their needs.
- 5) Benefits for the poor can come from research to introduce or improve aquaculture production (e.g., genetics, culture systems, domestication of new species) and research and development studies to promote better resource management (e.g., co-management regimes).

In addition to consideration of regions and resource systems, other dimensions that need to be considered more fully in ICLARM's planning process include: (1) alternative sources of supply of the types of research that ICLARM produces (2) expected developments in science; and (3) the need to be realistic in terms of needs vs. means (i.e., need for setting priorities among resource systems by regions).

ICLARM has not been able to focus much effort yet on an analysis of alternative sources of supply. As indicated earlier, ICLARM is the only international research institution dealing with aquaculture and fisheries on a global scale. Yet, there are a number of good regional and national institutions that need to be considered as ICLARM proceeds with implementation of its strategy.

**The Panel suggests that ICLARM be more explicit in its assessment of alternative sources of supply of research expertise and the potential for building complementarities with these alternative sources.** Such information will be useful not only for ICLARM, but also for other institutions in terms of designing and organizing collaborative relationships.

In terms of developments in science related to LARM, it appears to the Panel that ICLARM is well connected to the sources of innovations in science and that the Center, while not a major contributor to leading-edge research that pushes the frontiers, certainly is a major adopter of state-of-the-art approaches that can contribute to achievement of its mission, goals and objectives.

### 2.1.3 Development of the Medium Term Plan

As part of the preparation for the 1998-2000 Plan period, ICLARM circulated a discussion paper in July 1996 on likely research areas. The paper was sent to approximately 400 leaders in the field of fisheries and aquatic resources from NARS, international research centers, NGOs and donor agencies. The response exceeded expectations; over 100 considered written replies were received, along with much additional informal feedback. The discussion paper and the responses received formed the basis for a specially convened discussion in September 1996 with an invited Scientific

Advisory Panel, selected to represent a cross section (by subject matter, region, research or development background) of expert opinion. The recommendations of the Advisory panel were discussed by the ICLARM Board immediately afterwards, and the MTP for the period 1998-2000 drafted. It has been modified following internal ICLARM discussion to cover the evolution of activities through the period 1999-2001.

The Panel believes that a key challenge faced by ICLARM is the fact that it has a broad research mandate and very limited resources to address that mandate. Although the impact of these limited resources can be considerably enhanced by wise choice of research topics and collaborative research, many choices must be made to balance work among aquatic resource systems, scientific disciplines, regions, production-oriented vs. natural resource management research, between research and capacity building and training and among stakeholder interests. ICLARM does not yet appear to have in place fully transparent guidelines and mechanisms for making the difficult choices when funds are limited. While the Panel recognizes that such guidelines do not exist in many centers, it still urges ICLARM to devote more attention to developing and utilizing a more transparent mechanism for priority setting and resource allocation.

#### **2.1.4 Overall Assessment of Planning and Priority Setting**

The planning process at ICLARM is a qualitative one based on inputs from stakeholders and judgement on the part of the experienced staff at ICLARM and a group of experts brought together by the Center. The process, while mainly qualitative and intuitive in nature, appears to the Panel to be logical, transparent, and inclusive and sensitive to the input of outside stakeholders. Unsolicited comments from a wide range of stakeholders interviewed by the Panel indicated that they are pleased with the way in which ICLARM consults them and takes their suggestions into account. The strategic plan currently evolving uses available data and information in a sensible fashion, recognizing both the value of knowing approximations and the limitations of poor data.

At the operational level, the Panel believes that there is room for improving the linkages between project planning and budget planning, as discussed in Section 4.3. This gap, in fact, is expected to be closed in 1999 with the advent of an integrated planning and budgeting process.

## **2.2 ICLARM's Programs**

ICLARM's mission and goals as outlined in chapter 1 translate into ICLARM's specific research objectives, which are to:

- raise and sustain the productivity of fisheries and aquaculture systems;
- protect the aquatic environment;
- save aquatic biodiversity;
- improve policies for sustainable development of aquatic resources; and
- strengthen the capacity of national programs to support sustainable development.

ICLARM currently has nine programs that address these objectives, including 7 research focused programs, one program that promotes, manages and supports international partnership and network activity of the Center, and one program that supports all the other programs with information, library, training and public awareness activities. ICLARM is conscious of how its programs and projects fit within the broader framework of CGIAR activities. Table 2.2 provides description of the programs, their objectives, and the activities within programs. Table 2.3 indicates how they fit within the CGIAR activities framework. Each of the programs is described in greater detail in Appendix IV. The distribution of ICLARM budget and program related IRS and NRS staff among the programs is indicated in Table 2.4

**Table 2.2. ICLARM's NINE PROGRAMS: THEIR OBJECTIVES AND MAIN ACTIVITIES**

<p><b>Aquatic Environments Program (AEP)</b></p> <p>The program conducts research on the health and management of aquatic ecosystems (principally coral reefs and the coastal zone), and their relationship to quality of life.</p> <p>The main thrusts are the accumulation and dissemination of coral reef information globally. Social and management parameters influencing coral reef management and preliminary genetic studies of the interconnectedness of coral reefs. ICLARM conducts coastal zone management training under this program.</p>	<p><u>Activities</u></p> <ul style="list-style-type: none"> <li>• ReefBase - a global relational database on coral reefs and their resources, which is the official database of the global coral reef monitoring network</li> <li>• RAMP – Rapid Assessment of Management Parameters</li> <li>• PISCES – Population Interdependencies in the South China Sea Ecosystem</li> <li>• CMTP – Coastal Management Training Program</li> <li>• PCE – Population Consumption and Environment</li> </ul>
<p><b>Biodiversity and Genetic Resources Program (BGRP)</b></p> <p>The Program pursues strategic research on fish biodiversity and genetic resources.</p> <p>Its main thrusts are: 1) research and development of methods to characterize the diversity of species important for aquaculture in developing countries; 2) work on the development of biodiversity information (particularly on finfishes) and the training of biodiversity and fisheries managers on these and related ICLARM tools; and 3) the presentation of ICLARM's perspective and the need to consider aquatic resources in international fora dealing with genetic resource issues.</p>	<p><u>Activities</u></p> <ul style="list-style-type: none"> <li>• Strategic Research and Development of Methods (including Fish Biodiversity in the Coastal Zone; and Genetic Diversity of the Silver Barb, <i>Barbodes gonionotus</i> in Southeast Asia)</li> <li>• Information and Training (including Strengthening Fisheries and Biodiversity Management in African, Caribbean and Pacific (ACP) Developing Countries, with further Development of a Biological Database on Fish (FishBase); LarvalBase, a contributing module of FishBase)</li> <li>• Representation and Advisory (including contributions to the Systemwide Genetic Resources Program (SGRP), the Systemwide Information Network for Genetic Resources (SINGER), and other CBD/SBSTTA/FAO/GBF and IUCN Meetings and activities and a recent Bellagio Conference and continued collaboration with FAO.</li> </ul>
<p><b>Coastal Aquaculture and Stock Enhancement Program (CASEP)</b></p> <p>The program develops and disseminates profitable village-based methods for farming and restocking valuable fisheries species associated with coral reefs, such as giant clams, pearl oysters and sea cucumbers. This work is conducted in and for the island nations of the Pacific and is relevant to similar coastal environments throughout Southeast Asia.</p> <p>The main thrusts are on the development of low cost, low input and technologies for the growout and restocking of endangered invertebrate species. Recently, the effects of environmental disturbance (logging) on the health of coral reefs and new initiatives to examine the grow out of wild caught juvenile reef fish have been started.</p>	<p><u>Activities</u></p> <ul style="list-style-type: none"> <li>• Village farming and restocking of giant clams</li> <li>• Development of village farms for blacklip pearl oysters in Solomon Islands</li> <li>• Development of methods for the mass-rearing of tropical sea cucumbers for the purpose of enhancing wild stocks</li> <li>• Determining the ecology of juvenile sandfish, <i>Holothuria scabra</i>, for the enhancement of wild stocks</li> <li>• Development of new artisanal fisheries based on the capture and culture of postlarval coral reef fish</li> <li>• An assessment of the effects of logging on coastal aquatic environments</li> </ul>

<p><b>Fisheries Resources Assessment and Management Program (FRAMP)</b></p> <p>This program seeks methods for data collection and tools for assessment and management of fish stocks.</p> <p>The main thrusts of the program are in ecosystem modelling, an analysis of the dynamics of coastal fisheries in Asia through the development of analytical software packages and methods, and an analysis of the biological basis of the establishment and efficacy of marine protected areas.</p>	<p><i>Activities</i></p> <ul style="list-style-type: none"> <li>• Tropical Fish Stock Assessment</li> <li>• Modeling of Multispecies Fisheries</li> <li>• Caribbean Marine Protected Areas Project: The Role of Marine Protected Areas in Fisheries Management and Biodiversity Conservation in Coral Reef Ecosystems</li> <li>• Regional Technical Assistance Toward Strategies and Action Plans for Sustainable Management of Coastal Fish Stocks in Tropical Asia</li> <li>• Testing the Use of Marine Protected Areas to Manage Fisheries for Tropical Coral Reef Invertebrates - Arnavon Islands (Solomon Islands)</li> </ul>
<p><b>Germplasm Enhancement and Breeding Program (GEBP)</b></p> <p>This program develops and disseminates techniques for improving breeds of fish.</p> <p>The main thrusts have been the development of a tilapia strain genetically enhanced for growth performance and socio-economic impact evaluation of its introduction into countries in Asia. Work on carps focuses on establishing an inventory of genetic resources of these species and identifying through socio-economic analysis species and traits for future research of importance to ICLARM stakeholders.</p> <p>Work is conducted in Asia and increasingly in Africa, with a focus on the transfer of appropriate genetic enhancement technology between continents. The work of the program is closely interlinked with ICLARM's INGA network.</p>	<p><i>Activities</i></p> <ul style="list-style-type: none"> <li>• Genetic Improvement of Carps in Asia</li> <li>• Genetic Improvement of Farmed Tilapias</li> <li>• Genetic Enhancement of Tilapia in Africa and West Asia</li> </ul>
<p><b>Integrated Aquaculture-Agriculture Systems Program (IAASP)</b></p> <p>The program aims to improve productivity and assess sustainability of small farms through integration of fish farming with agriculture.</p> <p>The main thrusts have been to examine the adoption of appropriate aquaculture technology in three contrasting agro-ecologies; the forested uplands of humid Asia, the floodplains of humid Asia, and the warm southern tropics of Africa having only annual rainfall.</p> <p>The work is supported by the development at headquarters of a farming systems tool which examines nutrient and other on the farm flows through a participatory approach. Results are extended through extensive collaboration with NGOs and through targetted training materials with regional and international partners.</p>	<p><i>Activities</i></p> <ul style="list-style-type: none"> <li>• RESTORE Project</li> <li>• IAA in Forest Buffer Zone Management (Quirino, Philippines)</li> <li>• Sustainability Indicators for IAA Systems</li> <li>• Deepwater Rice-Fish Project (Bangladesh, Vietnam)</li> <li>• Malawi Aquaculture Project/IAA in Southern Africa</li> <li>• Sustainable Aquaculture in Bangladesh</li> </ul>

<p><b>International Partnerships and Networks Program (IPNP)</b></p> <p>The main thrusts are to strengthen and create partnerships and coordinate research and information networks to improve management of living aquatic resources.</p>	<p><u>Activities:</u></p> <ul style="list-style-type: none"> <li>• Projects (including Dissemination and Evaluation of Genetically Improved Tilapia in Asia (DEGITA); Genetic Improvement of Carp Species in Asia; and Characterization and Documentation of Tilapia Species for Aquaculture in Africa)</li> <li>• Research Networks (including International Network on Genetics in Aquaculture (INGA); and Asian Fisheries Social Science Research Network (AFSSRN)),</li> <li>• Information Networks (including Network of Tropical Aquaculture and Fisheries Professionals (NTAFP); formerly two separate networks. Network of Tropical Fisheries Scientists (NTFS) established in 1982 and Network of Tropical Aquaculture Scientists (NTAS) established in 1987.</li> </ul>
<p><b>Information and Training Program (ITP)</b></p> <p>The program assists in disseminating information and creating an awareness of global fisheries issues.</p> <p>The main thrusts are to support ICLARM's publication and library and information services through the provision of ICLARM's research results and specialist information on aquaculture and fisheries relevant to developing country scientists and managers.</p> <p>Training has largely been conducted in association with ICLARM's research programs but the ITP has formulated a coherent institutional strategy for the future. ICLARM's publication staff also contribute to ICLARM's public awareness materials, commissioned by institute management.</p>	<p><u>Activities</u></p> <ul style="list-style-type: none"> <li>• Production of ICLARM publications such as the Operational Plan, Annual Report, Naga and Newsplash; of technical publications under the following series - Conference Proceedings, Technical Reports, Studies and Reviews, Education Series, etc.</li> <li>• Preparation of displays of ICLARM research programs/projects and of books for various exhibits/bookfairs.</li> <li>• Preparation of press releases and coordination of press conferences/interviews to publicize ICLARM work.</li> <li>• Continuous monitoring, updating and development of the ICLARM homepage as an additional method of reaching a greater number of audience effectively and efficiently.</li> <li>• Coordination in the translation of ICLARM publications and documents to enable non-English speaking scientists to know of scientific developments.</li> </ul>
<p><b>Policy Research and Impact Assessment Program (PRIAP)</b></p> <p>This program analyses and evaluates the impact of new techniques, management practices and socioeconomic structures to inform and improve policy decisions relating to aquatic resources.</p> <p>The main thrusts of the program are focused on developing evaluation techniques for aquatic resources and contributing analysis of governance mechanisms for the cooperative exploitation of common aquatic resources.</p> <p>The program seeks to consolidate research on the theme of the contribution of fisheries to food security. It currently leads ICLARM's institutional approach to impact assessment of its own technologies and more generally, the effects of policy decisions or alternative uses on aquatic resources.</p>	<p><u>Activities</u></p> <ul style="list-style-type: none"> <li>• Ecological Economics for the Sustainable Use of Aquatic Resource Systems (including the Coastal Fisheries Co-Management project; and the CBFM Policy Research on User-based Management project)</li> <li>• Impact of Aquatic Resources Research: Methods and Assessment</li> <li>• Policy Analysis of the Contribution of Fisheries to Food Security</li> <li>• Other affiliations (collaboration with networks, professional associations and institutes etc.)</li> </ul>

**Table 2.3. ICLARM's PROGRAMS AND PROJECTS: ADDRESSING CGIAR ACTIVITY CATEGORIES**

PROGRAM	PROJECT	CGIAR Activity Category				
		<i>Improving Productivity</i>	<i>Protecting the Environment</i>	<i>Saving Biodiversity</i>	<i>Improving Policies</i>	<i>Strengthening National Systems</i>
1. Biodiversity and Genetic Resources Program (BGRP)	1. Assessing aquatic biodiversity & genetic resources	+	+	++	+	+
BGRP	2. Aquatic biodiversity & genetic resources training	+	+	+	+	++
2. Germplasm Enhancement Breeding Program (GEBP)	3. Fish germplasm enhancement & breeding	++				+
3. Aquatic Environments Program (AEP)	4. Assessing & managing coral reef degradation		++	+	+	+
AEP	5. Facilitating decision-making in coastal zone management*		++	+	++	+
AEP	6. Multi-sectoral use of inland aquatic resource systems*	+	++	+	+	
AEP	7. System-wide initiative on coastal environments*		++	+	++	+
4. Fisheries Resources Assessment and Management Program (FRAMP)	8. Fisheries resources assessment & management	+	++	+	+	+
5. Integrated Aquaculture-Agriculture Systems Program (IAASP)	9. Aquaculture-agriculture systems analysis & management	++	+			+
6. Coastal Aquaculture and Stock Enhancement Program (CASEP)	10. Aquaculture & enhanced fisheries on coral reefs	++		+		+
7. Policy Research and Impact Assessment Program (PRIAP)	11. Ecological economics		+	+	++	
PRIAP	12. Aquatic resources research impact	+	+	+	++	+
PRIAP	13. Policy analysis				++	
8. Information and Training Program (ITP)	14. Multilingual scientific information & communication	+	+	+	+	++
ITP	15. New methods & technologies for training					++
9. International Partnerships and Networks Program (INTP)	16. Information & research networks & linkages	++			+	++
GEBP	17. Fish Health: Baseline Studies & Diagnostics*	++			+	+

Represents the CGIAR Activity Category which best fits the major focus of each project.

Represents other activities to which aspects of the projects also contribute.

Projects 5, 6, 7 and 17, prefigured in ICLARM's MTP 1998-2000 are not currently active (see (ICLARM MTP 1999-2001). Fish Health will only be place under GEBP if the major activity is the genetics of disease resistance.



ICLARM's programs interact with each other in various ways. Table 2.4 provides an indication of the extent of linkages. ICLARM is conscious of the need to promote program linkages because of the interdisciplinary and interlocked nature of the issues with which it is dealing. Most issues can only be resolved through a broad, integrated approach.

**Table 2.4 ICLARM 1999 PLANNED BUDGET FOR PROGRAMS**

Project Code	Unit	Person Years		Budget US\$ (K)			
		IRS	NRS	Unrestricted	Restricted	Total	%
A. Programs							
Biodiversity & Genetic Resources Program		4.00	14.00	199	1,609	1,808	15.9
Integrated Agri-Aqua Systems Program		3.27	25.50	361	1,072	1,433	12.6
Aquatic Environments Program		1.00	12.00	234	135	369	3.3
Coastal Aquaculture & Stock Enhancement Program		3.00	45.67	536	356	892	7.8
Fisheries Resource Assessment & Management Program		2.10	8.00	159	473	632	5.6
Policy Research & Impact Assessment Program		3.41	12.58	168	592	760	6.7
Information & Training Program		1.00	17.00	425	-	425	3.7
International Partnership & Network Program		1.00	2.58	126	196	322	2.8
Germplasm Enhancement & Breeding Program		1.73	4.00	90	250	340	3.0
Abassa, Egypt		2.00	91.00	1,166		1,166	10.2
TOTAL		22.51	232.33	3,464	4,683	8,147	71.6

Note: Above figures do not include pipeline projects.

**Table 2.5 MATRIX OF INTERNAL PROGRAM LINKAGES**

	BGRP	GEBP	AEP	FRAMP	IAASP	CASEP	PRIAP	ITP	IPNP
BGRP	---	XXX	XXX	XXX	XXX	XXX		XXX	
GEBP	XXX	---			XXX	(XXX)	XXX	XXX	XXX
AEP	XXX		---	XXX		XXX	XXX	XXX	
FRAMP	XXX		XXX	---		XXX	XXX	XXX	XXX
IAASP	XXX	XXX			---		XXX	XXX	XXX
CASEP	XXX	(XXX)	XXX	XXX		---	XXX	XXX	
PRIAP		XXX	XXX	XXX	XXX	XXX	---	XXX	XXX
ITP	XXX	XXX	XXX	XXX	XXX	XXX	XXX	---	XXX
IPNP		XXX		XXX	XXX		XXX	XXX	---

(Note: 'XXX' denotes existing linkage; '(XXX)' denotes potential linkage)

## 2.3 Program Achievements and Impacts

This section reviews briefly ICLARM's approach to impact assessment and summarizes results of the Panel's qualitative assessment of available information on impacts.

### 2.3.1 Assessing Impacts: The ICLARM Approach

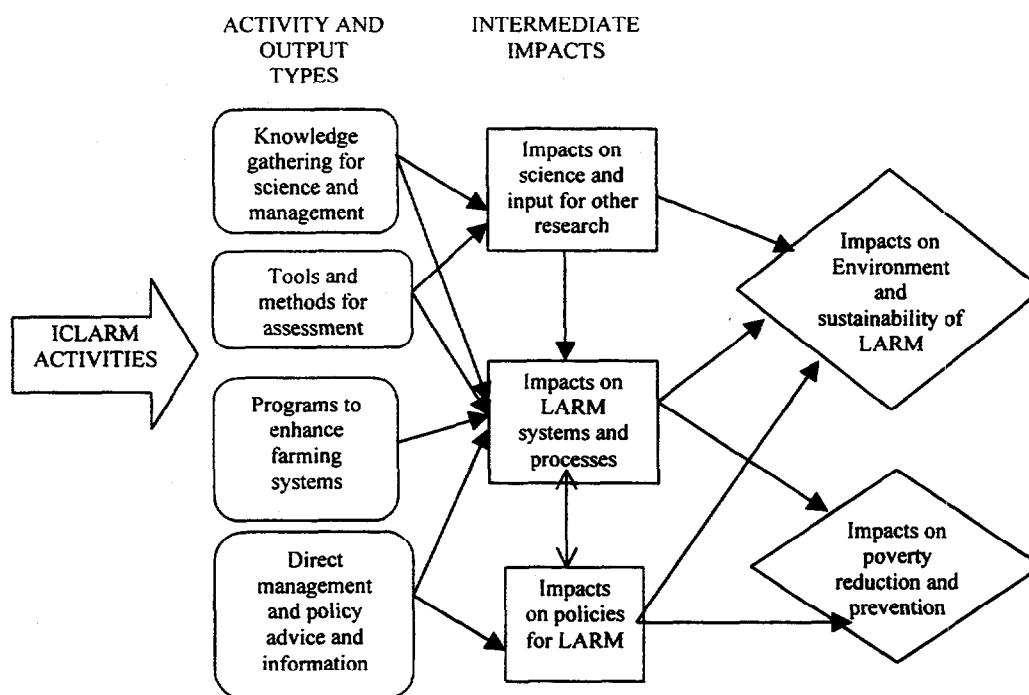
ICLARM aims to develop a culture in which data for impact assessment are collected as part of day to day research process of various projects. The three components of the R&D impact assessment continuum are:

- Ex-Ante Impact Assessment and Priority Setting.
- Monitoring and Evaluation.
- Ex-post Impact Assessment.

Systematic impact assessment at ICLARM is still in the developmental stages. The strategies to operationalize impact assessment at ICLARM will be:

- Institutionalization and integration of research evaluation into the research process at ICLARM.
- Validation of ex-ante estimates through ex-post studies.
- Developing mechanisms for a systematic and comprehensive impact assessment of technologies, management options, software, knowledge and/or information resources generated by ICLARM and its partner institutions, NARS and NGOs.
- Interaction with NARS and other sister CGIAR centers.
- Develop an impact database that will allow storage and retrieval, and integration of primary and secondary impact data.

ICLARM recognizes that the path from research idea through research planning, execution, dissemination, adoption, use and, finally, to impact on intended beneficiaries mostly is a complex one that involves a great deal of uncertainty. As indicated in Figure 2.3.1, ICLARM's activities lead to four main types of outputs (recognizing that they could be classified in many other ways). They lead to: 1) knowledge generation for other scientists and for management (e.g., much of the biodiversity and genetics work); 2) development of tools both for science and for management (e.g., FishBase, EcoPath); 3) research that leads to possibilities for direct LARM program improvements (e.g., GIFT and the Carp research); and 4) research that leads to policy advice (e.g., the co-management work, the Reefs at Risk work). Cutting across these four categories are the information, training and other capacity building activities that help to increase the effectiveness of dissemination and use (i.e., the intermediate impacts) of ICLARM's research. Linking both capacity strengthening and research activities are the partnering and networking activities initiated and managed by ICLARM.



**Figure 2.3.1. ICLARM's Impact Pathways to Poverty Alleviation and Environment Enhancement**

If successful, these activities will have intermediate impacts on science that addresses LARM issues, on management systems, and on policies. In turn, the advances in other research institutions, the changes in management systems, and the changes in policy and scientific discovery presumably will lead to ultimate impacts on poor people and the environment, measured against ICLARM's mission and goals and ultimately those of the CGIAR related to poverty alleviation through a healthier and better nourished human family; reduced pressures on fragile natural resources; and establishment and enforcement of people centered policies for sustainable development. In what follows, the Panel assesses the impacts of ICLARM in the context of these intermediate impacts leading to poverty alleviation. By necessity, the assessment is qualitative, since only isolated quantitative assessments are available for particular activities and projects.

### **2.3.2 ICLARM Impacts - A Qualitative Overview of Impacts on Poverty Alleviation**

ICLARM's programs tend to concentrate more on issues of sustainability and raising availability of food, which create a climate from which the poor can benefit. In part, this argues for a trickle down effect whereby the greater stability and availability of food supplies will reduce prices making fish more affordable to the poorer sectors of society. Two programs, IAASP and CASEP, attempt to have direct impacts on poverty alleviation by working with poorer farmers and fishermen to give them a greater range of options for income and diet. CASEP has had a direct influence on island communities in the Pacific that are particularly dependent on the marine environment for their survival. Extensions of this program are planned to enlarge the geographical scope to further Pacific and Caribbean islands. AEP seeks better management of coral reefs that support large numbers of poor fishermen. ICLARM projects also have more indirect impacts through a focus on the following three aims:

#### **2.3.2.1 Aim: healthier, better-nourished human families**

This aim is most directly supported by ICLARM's objective of *raising and sustaining the productivity of fisheries and aquaculture systems*. Sustainability and improved food supplies can be achieved in two ways. Firstly, in the current climate whereby marine and inland fish stocks are at their maximum levels of exploitation, or are even overexploited, gains can be made through the better management of the wild stocks. Secondly, the absolute amount and quality of food can be increased through improvements to aquaculture. FRAMP addresses the first of these approaches through the development of models that assist managers to reach decisions about the exploitation level and allocation of the resource. The second of these approaches is being addressed in different ways. GEBP has had considerable past success in its development of the GIFT tilapia and is to apply its techniques to other species of significance for aquaculture such as carps. Both CASEP and IAASP are developing extensive culture systems for ranching of aquatic organisms. CASEP is doing this in the marine environment mainly with invertebrate species, and IAASP is intending applying similar stocking based techniques to small inland waterbodies.

#### **2.3.2.2 Aim: reduced pressures on fragile natural resources**

Two objectives *protecting the aquatic environment* and *saving aquatic biodiversity* are related to this aim. The world community has identified conservation as a major priority for management through the Convention on Biological Diversity and through specific conventions such as RAMSAR. ICLARM addresses these issues at two main levels, through international efforts including high level support to the CBD, and through direct support to member countries in conserving their national ecosystems.

The Biodiversity and Genetic Resources Program (BGRP) adopts both approaches. FISHBASE is a unique catalogue of the world's fish biodiversity and as such assists national and international research institutes in the characterization and localization of faunas. Genetic characterization of species and species groups will assist in defining the genetic variability. The Bellagio Conference provided direct inputs to the SBSTTA of the CBD. BGRP produced 61 publications relative to this field in 1996-98.

The Aquatic Environments Program (AEP) maintains a powerful database on one of the most fragile and threatened ecosystems, coral reefs, through REEFBASE. This database has been distributed to over 1650 registered users and associated training manuals have been used to train nearly 200 coastal managers. The program also assists member countries in better managing coastal resources through its coastal management training program. FRAMP also does this through the setting up of marine reserves.

FRAMP assists in the reduction of pressures on fragile natural resources through its holistic approach to the evaluation and management of fisheries.

#### **2.3.2.3 Aim: people centered policies for sustainable development**

Two objectives, *improving policies for sustainable development* and *strengthening the capacity of national programs to support sustainable development* are most closely related to this aim. Modern approaches to the management of natural resources tend to strongly encourage governments to devolve greater responsibilities to stakeholders for the management of their resources. This usually takes the form of some participatory or co-management system which has implications far in excess of a simple assignment of rights. An appropriate, country specific, infrastructure must be established which defines the role of the different stakeholders. Some provision for scientific advice is needed that operates at the level of the principal decision-maker. Awareness programs are essential to inform all stakeholders of policies and the status of the fisheries. ICLARM is supporting these efforts in a number of ways. The major thrust of PRIAP is to assist governments in the policy aspects, ITP handles the awareness and information dissemination aspects, IPNP seeks to set up mechanisms for better collaboration among partners, and AEP through its "Reefs at Risk" thrust has impacts on policies. It should be emphasized here that in discharging these functions ICLARM recognizes that it is carrying out research on the most appropriate approaches to these various functions. It does not envisage, nor should it assume a regular extension role, which would compromise its research-oriented status. In addition to the activities of these two, most programs have training components that contribute to knowledge of their specific sector. In this case the risk of their assuming an extension persona varies according to the subject matter. There would appear to be little risk in the case of BGRP, GEBCO, FRAMP and AEP but IAASP and CASEP have to be watchful that this borderline is not crossed.

#### **2.3.3 Quantitative evidence of impacts**

Despite its relatively small size, ICLARM has made remarkable scientific contributions and produced a significant amount of international public goods which are helping frame broader discussions on aquatic resources management and policy. Through its research, ICLARM has raised public awareness of aquatic issues at a global scale (limits and threats to aquatic production, impacts of over fishing and climate change etc.) and influenced the way people perceive and interact with aquatic resources. Examples of impacts of some of these achievements follow as presented in Tables 2.6a-c.

Table 2.6a. IMPACT OF SOFTWARE TOOLS AND RELATIONAL DATA BASE

	Product/Output	Impact Indicators
Fishbase  (First released in 1994, development work to continue till 2000)	<ul style="list-style-type: none"> <li>• Computerized data on 20,000 of the world's 25,000 finfish species</li> <li>• 3,000 CDs of the database distributed, yearly updates provided</li> <li>• Training on use of Fishbase for management for 8 countries in the Pacific, 15 Caribbean countries and 55 African countries</li> <li>• Linkages to allow for interactions with data bases held by FAO and ALCOM</li> </ul>	<ul style="list-style-type: none"> <li>• 1,400 registered CD owners, from 128 countries of which 36% developing countries; actual users estimated to be double this number</li> <li>• 100 publications have cited the use of Fishbase; of these, 20 draw heavily on Fishbase data</li> <li>• Fishbase has been used for national fisheries assessment in the Philippines and Trinidad.</li> </ul>
Reefbase  (first released in 1996)	<ul style="list-style-type: none"> <li>• Global data on coral reef</li> <li>• Over 1,650 copies of the database has been distributed, demand for it is rising</li> <li>• Approximately 40 scientific publications</li> </ul>	<ul style="list-style-type: none"> <li>• Reefbase has been a major input into the "State of the Reefs" Report, the background document for the <i>International Coral Reef Initiatives</i></li> <li>• In collaboration with the WRI and the World Conservation Monitoring Center, ICLARM produced the "Reefs at Risk Report" using Reefbase</li> <li>• Reefbase has greatly contributed to public awareness on the state of the world coral reefs: It attracted media attention including an interview with CNN</li> <li>• 13,000 hits on the Reefbase website since its inception in late 1996</li> </ul>
ECOPATH with ECOSim	<ul style="list-style-type: none"> <li>• Ecosystem modeling software allowing dynamic evaluation of the effects of fishery and other interventions on catches</li> <li>• Workshop on applications of ECOPATH for fisheries management</li> </ul>	<ul style="list-style-type: none"> <li>• 750 documented users in 94 countries; of these, 150 are active users</li> <li>• 93 published models utilizing ECOPATH for various aquatic systems; another 45 models for major ecosystems in progress; an estimated 60 ecosystems have been characterized using ECOPATH</li> <li>• Having increasing impact on the way managers approach fisheries management and helping frame research questions and identify knowledge and data gaps.</li> </ul>
RESTORE  (in development since 1992)	<ul style="list-style-type: none"> <li>• Integrated aquaculture and farming systems management software</li> <li>• 250 diskette copies of the software distributed</li> <li>• alongside the software, has promoted the use of participatory approach to integrated farming systems research</li> </ul>	<ul style="list-style-type: none"> <li>• software now being employed as training, monitoring, and impact assessment tool by donors (USAID, DFID, DutchAid), UN Programs, large NGOs in Bangladesh and the FAO Farming Systems Group</li> <li>• Participatory approach suggested by RESTORE has been adopted by DFID in its projects in Cambodia, Vietnam, Laos, Thailand, Bangladesh and India</li> </ul>

Table 2.6b. IMPACT OF AQUACULTURE RESEARCH INITIATIVES

Category (Aquaculture)	Productivity	On Farm Growth Improvements	External Feed Demands	Retail Prices	Technology Transfer Process	Other
GIFT Tilapia		18% in China to 66% in Bangladesh	<ul style="list-style-type: none"> <li>Decrease by 30% in Bangladesh</li> <li>Decrease by 20% in China</li> </ul>	Decrease by 11 to 14.5% in the Philippines	Through INGA	
Small-scale Aquaculture in Bangladesh	<ul style="list-style-type: none"> <li>Household incomes increase by 12.9%</li> <li>Fish production increase by 1,000 kg/ha/yr</li> </ul>		On farm resource through integrated		None	Enhanced nutrition, water conservation
Small-scale aquaculture in Malawi	Fish production increase by 800 kg/ha/yr		On farm resources through integration		None	Enhanced nutrition, ecological efficiency water management
Village farming of giant clams (Solomon Islands)	26 farmers participating; some are beginning to derive additional income		Natural feed source, no additional feed requirement			Has encouraged commercial propagation of corals for the aquarium trade; establishment of brood stock of reef species (giant clams and sea cucumbers)

ICLARM has successfully employed networks as an effective tool for transferring technology and disseminating and exchanging information among collaborating scientists, institutions and countries (Table 2.6c). ICLARM disseminates its research findings through publications, workshops, training and networking. By mid-1998 ICLARM had published 229 of its own publications and conference proceedings, 86 papers in externally refereed journals and 177 contributions to other journals and conference proceedings. ICLARM has also significantly contributed to capacity strengthening and training of NARS and other institutional partners through research, training and networking. Between 1994 and 1998, ICLARM trained a total of 7,046 men and women from on various aspects of fisheries management and aquaculture. During the same period, ICLARM staff co-authored 83 publications with NARS collaborators.

Table 2.3.3c. LINKAGES THROUGH NETWORKS

Network	No. of countries covered	Membership	Area of focus
1. Network of Tropical Aquaculture and Fisheries Professional (NTAFP)	130	2,000	<ul style="list-style-type: none"> <li>• Information dissemination</li> <li>• Publication of material</li> </ul>
2. International Network for Genetics in Aquaculture (INGA)	13 (9 in Asia; 4 in Africa and Fiji; 11 Advanced Research Institute)		<ul style="list-style-type: none"> <li>• Exchange of information</li> <li>• Exchange of germplasm</li> <li>• Development of significant uses</li> <li>• Program capability of NARS</li> </ul>
3. Asian Fisheries Social Science Research Network (AFSSRN)	Now coordinated by Asian Fisheries Society and Management devolved to NARS		<ul style="list-style-type: none"> <li>• Promotes research and training in social science aspects of fisheries</li> <li>• Facilitating training</li> </ul>

### 2.3.4 Conclusions on Impact

The panel supports ICLARM's aggressive efforts to institute an "impact assessment culture" in all its program staff. The Center recognizes that it is important to judge the effectiveness of past and present programs; and that such information can help in framing programs for the future. At present, ICLARM is only starting on the difficult task of quantifying impacts. In the meantime, the Panel's qualitative assessment of ICLARM's impact pathways and likely impacts provides a logical background for looking at the evidence available.

## 2.4 Panel's Assessment and Recommendations

ICLARM's nine programs work together in various ways, but exist as separate units administratively and in terms of planning and implementing their activities. Much of the factual material used in this assessment is summarized in Appendix IV. The present section summarizes the Panel's assessment of the programs.

### 2.4.1 CCERs - Center Commissioned External Reviews of Programs

Two of the research programs have been subject to CCERs since the 1995 Midterm Review, namely, IAASP and AEP. In addition, CASEP and the GIFT project have been subject to formal donor reviews. The Panel evaluated the quality of these reviews and used their results along with other information in reaching its own conclusions. CCERs also were carried out since the MTR for

Corporate Services, the Board, and for the Offices of Internal and External Relations. These are covered in chapter 4. A few comments follow on the two most recent CCERs of research programs.

**CCER of the Aquatic Environments Program.** This CCER was conducted in August 1998 to review past, current and planned activities of the AEP. Two leading coral reef scientists carried out the work, interacting closely with the program leader and research staff. The review made recommendations to improve aspects of ReefBase in order to be effective management and scientific tools. It also recommended consolidation of AEP's research and training efforts to focus on coral reef issues within the framework of integrated coastal management. The review is considered by the Panel to provide an adequate assessment of quality of the AEP. The basic conclusions and recommendations were that the AEP was doing good science, that several activities within the program should eventually be devolved to NARS partners, that some tools needed further field testing, and that all activities should focus on creating international public goods by expanding beyond single countries or regions. AEP's development should be guided by clear objectives so that it can place priority on mainstream activities (this is important in preventing re-orientation towards donor agencies' needs).

**CCER of the Integrated Aquaculture-Agriculture Systems Program.** A 1997 CCER of the Integrated Aquaculture-Agriculture Systems Program was carried out by recognized, well-qualified experts, one in rural aquaculture and one in agricultural economics. In addition to working with all ICLARM staff involved, the team visited the two main outreach sites in Bangladesh and Malawi. The review found that individual components of the program have made notable contributions to the development and study of integrated aquaculture. As such the program was making progress in changing attitudes to rural aquaculture, although the Program still needs focus and a more coordinated approach to its various components. It felt that ICLARM should develop a long-term strategy for IAASP and associated programs. The CCER noted that activities in Bangladesh, are directed at extension rather than research. It questioned the utility and justification for the RESTORE software and recommended that ICLARM consider whether further investment in developing this software as an extension tool is justified. The program is strongly influenced by social and economic conditions within its largest communities yet has no qualified staff to research these issues. It was therefore recommended that such staff be recruited as soon as possible.

Management responded to the CCER by recognizing the merits of the assessment and the recommendation but has had insufficient time to recruit the requested staff. It has decided to continue with the RESTORE software modified in light of the review, subject to external review. The review will help ICLARM decide whether to pursue the approach, if it can capture separate funds to do so. It is also clarifying its strategy with regard to the program as a whole and the Malawi outreach site in particular. The EPMR Panel agrees in general with the assessment of the CCER Panel, and urges ICLARM to consider again the future of the IAASP in terms of its activities at headquarters and its role in terms of managing and coordinating apparently successful field projects.

**Donor Reviews of Research Programs.** The ACIAR (Australian Center for International Agriculture Research) donor review of CASEP (Solomon Islands work) took place in May 1998. It commended the research quality of the major projects and their relevance to Pacific Island village communities. It concluded that funds were efficiently utilized to produce good science with tangible benefits for individuals, nations and the Pacific region. The commitment by ICLARM and ACIAR to the maintenance of a long-term, international standard research infrastructure in the region was essential to the success of the projects. ICLARM responded positively to the recommendations of the Review. It agreed with 15 of the 18 recommendations and took steps to implement them. Of the 3 recommendations that it did not fully agree with, proper justification was provided.



The GIFT project has been reviewed annually, with a final review coming in 1996. In general this project has consistently received high marks from the reviewers. In fact the final report for the project said that this was one of the most important and successful of ICLARM's projects and that ICLARM needed to ensure that the work was continued and carried forward through various means.

#### 2.4.2 Panel Assessment of the Nine Programs

A summary of the Panel's assessment of each program is provided in Table 27. In general, the Panel concludes that ICLARM's research programs are focusing on relevant issues, are using good science, need to focus more on the production of IPGs, and need to consider alternatives to becoming involved in activities that are more extension or developmental in nature, often due to funding pressures from donors.

**The Panel suggests that ICLARM focus on the transfer to NARS of its approaches and experience in promoting integrated aquaculture so that they may be expanded to wider geographical areas.** Exceptions and details are provided in table 2.7. Assessment of the networking and partnering activities associated with the IPNP, and documentation, library, public awareness, and training functions of the ITP also are provided in table 2.7.

ICLARM has had activity in Africa for some time, including under the IAASP, BGRP, and GEBP. The INGA has become successfully established in Africa and now counts four members. ICLARM will continue to initiate activities in Africa under its program structure. In addition, work and logistical support will be centered out of its new Egyptian regional headquarters site for Africa and West Asia. Because of the interest in the Abbassa facility and its future and interest in ICLARM's expansion plans for Africa, the Panel devoted a separate section 2.5 to that subject.

TABLE 2.7. PANEL SUMMARY ASSESSMENT OF ICLARM'S PROGRAMS

PROGRAMS	PANEL ASSESSMENT AND SUGGESTIONS/RECOMMENDATIONS
AQUATIC ENVIRONMENTS PROGRAM (AEP)	<p>The projects undertaken by the AEP are appropriate for addressing its goals of improving sustainable use and conservation of aquatic habitats (especially coral reefs) and facilitating decision-making in coastal zone management.</p> <p>The Panel notes that the AEP was subject in 1998 to a CCER. The Panel reviewed the CCER and considers it a competent and insightful review with a solid set of recommendations to which ICLARM has responded positively.</p> <p>The Panel recognises the significance and impact of ReefBase as the only global repository of reef data. It agrees that ReefBase can be developed into a powerful management-support system for coral reefs, and that every effort be made to enhance the utility of ReefBase by ensuring the quality of data entered and including socio-economic and management parameters.</p> <p>The Panel agrees that the AEP's research and training activities be focused on the conservation of coral reefs within the wider framework of integrated coastal zone management which ties in with the CGAIR's goal of saving biodiversity and protecting the environment.</p>
BIODIVERSITY AND GENETIC RESOURCES PROGRAM (BGRP)	<p>This programme makes a substantial contribution to the conservation of biodiversity and fish genetic resources. ICLARM is one of the few international organizations undertaking this task; and its role in defining issues, in assisting the CBD in formulating its policies, and in helping partner countries in developing their own programmes through training is invaluable.</p> <p>The Panel strongly agrees with the need to collect information on fish species around the world for entry into FISHBASE, the main activity of this program. This database has achieved a critical mass that now enables it to be used as an independent research tool in conjunction with ECOPATH, FISAT and other analyses. As such, FISHBASE has become globally acknowledged as the major compilation on fish currently available.</p>

	<p>The development by ICLARM of large databases such as FISHBASE and the newer LARVALBASE raises broader questions on the policies of ICLARM with regard to its continuing commitment to develop and maintain such services.</p> <p>The Panel notes the leading role the program has played in supporting the international initiatives on genetic resources and biodiversity. It <u>suggests</u> that ICLARM continue to support the CBD and its associated organization by serving as a major resource for genetic and biodiversity aspects of living aquatic resources.</p>
COASTAL AQUACULTURE AND STOCK ENHANCEMENT PROGRAM (CASEP)	<p>The Panel believes that CASEP's activities are relevant to its goals of improving productivity of coral reef fisheries through development of biotechnical systems for the culture of high-value species by village farmers and cost-effective methods for propagating and releasing juveniles to restore and enhance inshore fisheries.</p> <p>The panel notes the conclusion of the 1998 ACIAR review that the program is producing good science and that there are tangible benefits for individuals, nations and the Pacific region. The review recommended that ICLARM continue to promote the development of aquaculture in the region by expanding the target species base and encouraging regional organisations to promote and develop the methods devised.</p> <p>The panel views with some concern the continued minimal input of social science and economic analysis, a weakness identified in the 1994 CCER review of the Coastal and Coral Reef Resource Systems Program and the 1998 ACIAR review of CASEP.</p> <p>The Panel <u>suggests</u> that future program planning in CASEP consider socio-economic dimensions at an early stage so that biological and economic analysis can proceed in tandem. To support this, stronger collaboration with PRIAP or partner institutions should be developed. In order to develop viable enterprises based on ICLARM-developed aquaculture technology and to achieve desired impacts, the program needs a well thought out extension strategy that includes supportive government policies that would encourage private investment.</p> <p>The Panel supports the ACIAR review's recommendation that the international public goods nature of CASEP's research be extended to the Pacific Islands region in collaboration with regional organizations, and that the program cooperate with the University of South Pacific in the delivery of post-graduate education in aquaculture in the region.</p> <p>The panel further <u>suggests</u> that an analysis on the ranching of multiple species should be carried out to determine the potential of polyculture in reducing risk, increasing efficiency of resource utilisation, smoothening expected income flow and increasing income.</p>
FISHERIES RESOURCES ASSESSMENT AND MANAGEMENT PROGRAM (FRAMP)	<p>This Program focuses on (i) developing software tools for the assessment of tropical fisheries an ecosystems, and (ii) evaluation of the role of fishery reserves in the management of both freshwater and marine fisheries. The research carried out is both important and strategic, and meets the international public goods objective of ICLARM (and the CGIAR).</p> <p>The software and databases are widely used in different parts of the world, covering both freshwater and marine environments. Further integration of the databases and analytical tools will help make the software even more powerful for use in research and monitoring. The Panel is convinced of the need to continually service the databases and analytical tools, taking into account new insights from research observations from partners. FiSAT for example has not been updated for the past 5 years, but is still widely used and there is no alternative tool available for tropical fisheries stock assessment.</p> <p>The Panel urges ICLARM to take this important need into account in its future work in FRAMP, and link this work with that of other international organizations and donors, as appropriate. The proposed consolidation of ICLARM's Programs provides an opportunity for reviewing the strategy for moving the FRAMP activities forward.</p> <p>The Panel considers that the work on Marine Protected Areas is important, and will elucidate unifying ecological concepts regarding the effective management of fishery reserves. A co-management project in San Salvador in northern Philippines, is already showing the benefits of the reserve in terms of improving the recovery of depleted fishery and is improving the likelihood of sustained production of both commercial species for food and the aquaria trade.</p> <p>The Panel <u>suggests</u> that the marine protected areas project take into account socioeconomic factors to further consolidate and increase the project's benefits.</p>

GERMPLASM ENHANCEMENT AND BREEDING PROGRAM (GEBP)	<p>The Program utilizes breeding and selection to enhance the genetic performance of fish in aquaculture. The success and impact of this program through the GIFT tilapia project is notable. ICLARM is also investigating intermediate technologies such as the production of sterile and mono sex hybrid for their improved performance in aquaculture.</p> <p>The Panel notes that genetic engineering is a new field that has become the cutting edge of modern science with the use of genetic information. ICLARM cannot be left behind in taking advantage of the new science. But the impact of this science on biodiversity, biosafety and food security as well as economic and social welfare is unknown. Little attention has been given to policy issues regarding aquatic genetic resources. Consideration needs to be given to the impacts of introducing genetically improved fish back into the wild. There are ethical, management and ecological issues associated with taking genetically improved tilapia to other countries.</p> <p><b>The Panel commends ICLARM for undertaking environmental risk assessment associated with genetic improvement on fish. Risk assessment should not be confined only to genetically engineered fish. There are potential environmental risks of re-introducing strains even created from traditional selective breeding back into the wild. The Panel endorses ICLARM's approach to environmental risk assessment as stated in its policy statement in IPR.</b></p>
INTEGRATED AQUACULTURE- AGRICULTURE SYSTEMS PROGRAM (IAASP)	<p>The panel considers that the themes of this program are fundamental to achieving the mission and aims of ICLARM. However, whereas individual components of this program have been successful, the program itself is diffuse with a number of differing research and outreach activities which are poorly related. The Panel recognizes that this may be because of the strongly donor driven nature of its projects.</p> <p>The Panel considers that extension aspects of this program, particularly in Bangladesh, may be out of proportion to the research, given ICLARM's role as a research institution. The Panel considers that the elaboration and testing of <i>approaches to extension</i> are a valid subject for research; and IAASP focus should be on this type of research, taking care to pass the approaches so developed on to NGOs and Government agencies for implementation. The program should involve extension agencies early in project formulation and include explicit provisions for the devolution of activities to appropriate national institutions.</p> <p>The recent CCER of this Program notes that it would benefit from in-depth re-examination of its objectives and modes of work, aimed at consolidating the different elements into a clearer unified framework. The CCER also suggests that the Program would benefit from the increased sociological and anthropological orientation and input. The Panel notes that the Program has responded with the development of a new strategy and plan for consolidation and integration of elements and with a proposal to increase social science input, particularly in terms of increased collaboration with other CGIAR Centers working on IAA issues in Africa. The CCER also challenged the conceptual basis of the RESTORE software and recommended that ICLARM review its future investment in the project. The Panel agrees with the CCER analysis and recommendation that ICLARM disengage itself from the software. It should seek other methods to analyze the IAA data.</p>
INTERNATIONAL PARTNERSHIPS AND NETWORKS PROGRAM AND INTERNATIONAL RELATIONS OFFICE (IPNP/IRO)	<p>The Panel considers that this program has spawned some highly successful and useful network activities that have helped to put ICLARM's name in the forefront in LARM research circles. For example, the INGA (International Network for Genetics for Aquaculture) appears to be active and successful. It currently involves 13 countries and 11 ARIs as Institutional members.</p> <p><b>While, the Panel does not dispute the benefits which derive from the ICLARM initiated and managed networks and partnerships, it suggests that ICLARM should assess very carefully the extent to which it should be managing networks once they have become established and are successful.</b></p> <p>In the case of Asian social science network. ICLARM helped establish and managed it for a time, and then spun it off to others, apparently with good success. In terms of future activity, ICLARM needs to establish clear criteria for deciding when devolution of networks, and particularly information networks, should take place.</p> <p><b>The Panel suggests that ICLARM take on the organization and management of networks only if they fit directly with the research and related programs of the Center. It should not become a custodian of networks that do not directly relate to its own research.</b></p>

<p>INFORMATION AND TRAINING PROGRAM (ITP)</p>	<p>The Panel believes that ITP is making progress, particularly taking into account the significant budget cuts over the past few years. As the ITP grapples with ways to secure outside funding, it must not lose focus on its primary responsibilities. The Panel cautions against investing time in proposals where there is no existing base of expertise in ITP.</p> <p><b>ITP- Publications:</b> Staff reductions and staff resignations have stimulated restructuring in the Publications Unit. Overall, the publications are of high quality and attractive design. In the Publications area, statistics should be reported from a stakeholders as well as a production perspective. The Panel believes that where feasible, out-sourcing is preferable to in-house investment in equipment that can become rapidly out-dated. Publishing on the World-Wide-Web should be considered if this is the only way that a publication will be made available. At the same time, the Panel recognizes the dilemma that many potential key users in developing countries lack easy access to computers and the Web.</p> <p><b>The Panel <u>suggests</u> that the Publications Unit routinely survey those staff whose material is edited by the Unit as to their satisfaction with the service they receive.</b></p> <p><b>ITP – Library and Information Services:</b> Overall, LISU provides good reactive library services in relation to the resources available to it. Given the expertise of the LISU staff, there are opportunities to focus more on providing information support to researchers, management and the Human Resources Unit and by being a repository for all documents pertinent to the Center (at present these are scattered throughout individual offices with no bibliographic records maintained by the library). Because of the Library's limited resources (especially staff time), the Panel agrees with the 1994 CCER that the amount of resources devoted to maintaining the CITEANAL database could be more usefully employed elsewhere. It may be possible for ICLARM to interest a library school class/student to undertake some of this work. Otherwise, the Center might consider contracting with specialists in this area.</p> <p><b>The Panel <u>suggests</u> that because library services are a required component of a research center, the basic collections (especially journal subscriptions) continue to be supported by core funds if funding is not available.</b></p> <p><b>ITP- Public Awareness:</b> The Unit is to be commended for a broad approach despite limited resources.</p> <p><b>The Panel <u>suggests</u> that the Public Awareness Unit finalize and implement a concrete strategy for its work.</b></p> <p><b>ITP- Training:</b> In general, the Panel concurs with the training approach being proposed by the Center. It is pleased to note that ICLARM has in place a recent "Training Strategy" which consists of a "Training Policy" and a "Training Plan". However, these documents explore general issues and possibilities and do not serve as a detailed blueprint for training approaches and activities.</p> <p><b>The Panel <u>suggests</u> that timely ways be found to move the training strategy ahead, and to link the research programs that undertake training and the support activities of the ITP. Additionally, training statistics need to be maintained routinely and consistently.</b></p>
<p>POLICY RESEARCH AND IMPACT ASSESSMENT PROGRAM (PRIAP)</p>	<p>PRIAP is still in its very early stages of program development. It has had considerable achievement especially in the field of co-management. For PRIAP to be effective, especially in view of ICLARM's planned consolidation that would expand social science inputs into other programs, it needs to clarify at the outset the appropriate balance between its dual roles as a policy and ecological economics research program and as an impact assessment service unit for all of ICLARM. Within ICLARM, there has to be clarity on the level and extent of monitoring and impact assessment services other programs can realistically expect PRIAP to provide. And agreed upon funding mechanisms need to be in place in order to avoid a drain on PRIAP's research funding.</p> <p>The panel commends PRIAP's initial efforts to frame guidelines for multi-country, multi-site projects and for impact assessment in fisheries and aquaculture research. Indeed, the framing of comprehensive and consistent impact assessment guidelines for all types of ICLARM projects should be a priority PRIAP undertaking.</p> <p>The Panel also commends PRIAP's use of a broad-based consultative process for identifying areas of policy research priority. The approach demonstrates the Program's responsiveness to ICLARM's constituency and its pursuit of relevance in its research agenda.</p> <p>Having identified its priority areas for research, it is essential that PRIAP further refine and more clearly and concisely articulate the conceptual framework for the development and trajectory of its research program. It needs to clearly define the research space that would encompass PRIAP projects</p>

	<p>within the fisheries sustainability-growth-equity-food security nexus. It would also have to clarify the conceptual threads linking its projects at various levels. Moreover, PRIAP needs to explicitly define the relationship, role and appropriate levels of networking, extension and development activities that the program may undertake within this research space.</p> <p>The panel is concerned by the lack of adequate number of social and policy scientists, particularly at the senior research level, to deal with all the demands placed on PRIAP's expertise. It is important for PRIAP to recruit additional highly experienced, well-respected senior researchers.</p>
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The Panel assesses the Center's scientific program positively both in terms of its impact and on its quality. ICLARM has moved from its initial concentration on a limited number of technical topics to broadly based and socially relevant work. This covers both fish production and approaches to the management of wild fish and reef communities aimed at food security and the production of biodiversity.

The center is making steady progress in developing mechanisms for the dissemination and incorporation of the results of its research into national and regional programs. It is also working with an increasingly large pool of international and national collaborators to place itself at the center of current initiatives for research on living aquatic resources.

## 2.5 Program for Africa and West Asia and the Abbassa Regional Headquarters

As mentioned, the Panel decided that a separate section on current work and plans for the Africa region was warranted, given that (1) this is a priority region for expansion of ICLARM's work, and (2) ICLARM recently has set up a Regional Headquarters for Africa and West Asia, in Abbassa, Egypt. It stressed that by separating this theme from the discussion of the nine programs, the Panel is in no way suggesting that African and Abbassa activity should be separated from work in those programs. Quite the opposite is the case. Integration with, and management from headquarters is essential.

When ICLARM was offered the Abbassa facility in 1995, concern emerged in TAC and the CGIAR on the possible implications of accepting the offer for ICLARM's and the CGIAR's priorities. It was pointed out that the WANA region accounted for less than 5% of fisheries production in developing countries. TAC in particular feared that by accepting the responsibility for such a large facility, a disproportionate share of the CGIAR's resources for fisheries research would be allocated to the WANA region. ICLARM subsequently proposed that the Abbassa facility would serve as a regional headquarters for Africa and West Asia, which would bring proposed resource allocation to the region more in line with its ranking in the overall CGIAR priorities. Nevertheless, some doubts remained given that the Abbassa facility was located in an ecologically "unique" area. As a result, the opportunities for spillover of experimental results to the areas with biophysical environments suitable and promising for aquaculture and fisheries in the SSA was seen as rather limited.

While recognizing the challenges associated with making Abbassa a regional headquarters, ICLARM's Board and Management proceeded in accepting the Abbassa facility. The Group endorsed this decision but advised ICLARM to take the concerns expressed into account as it planned its operations. ICLARM started its work by organizing a major conference on the needs for fisheries in Africa and West Africa, at which the major stakeholders and NARS of the region were represented.

**The EPMPR panel has accepted the Abbassa facilities as a given, and proceeded proactively in its assessment and deliberations in the spirit of how best to utilize them.**

### 2.5.1 The Context: Opportunities in Africa and West Asia

As indicated in section 2.1, SubSaharan Africa (SSA) has several major areas of concern and opportunities related to fisheries and aquaculture which could benefit from ICLARM's involvement. These are:

- **The aquaculture potential.** SSA aquaculture is little developed and contributes only 0.2% of world production. Twelve countries contribute 90% of this production. A study by FAO showed that not all countries are suitable for aquaculture development. At the present physical and technological potential for expansion in suitable areas remains high but social, economic, marketing and infrastructural constraints continue to limit expansion. The successful intervention by ICLARM in Malawi and within a limited area in Ghana through its IAAS program, at the level of the small and medium sized farmer, could form a process for adaptation in other countries in SSA.
- **The big inland lakes** (e.g. Victoria, Tanganyika, Malawi, Kariba, Nubia-Nasser, Volta) some of which have potentials for expanded fisheries production, irrigation and tourism development. Some of these lakes (Tanganyika, Kariba) lie in remote and poorly developed areas characterized by poverty. These lakes could benefit from integrated and co-management interventions that promote sustainable production. These lakes have been the target of ongoing but isolated research from other agencies and ICLARM could synthesize their findings into a more coherent body of knowledge. ICLARM's programs such as ECOPATH and FiSAT have been used in several of these projects.
- **The potential of small water bodies.** Most Sub-Saharan countries are endowed with small water bodies with potential for fisheries development. These are either natural or artificial and are largely used for irrigation and domestic as well as livestock water supply. Southern Africa alone (excluding South Africa) has an estimated 12,430 dams covering an area of 126,089 ha.
- **Large rivers with extensive flood plains** (e.g., the Congo, the Zambezi, the Nile, the Niger). Many of the problems of river fisheries management are linked to integration of other practices in the basin so as to conserve water quality and quantity. Flood plains whose flood regime has been curtailed by damming present unique opportunities for aquaculture as is the case on the Kafue. ICLARM has programs on river fisheries in Bangladesh and the Mekong in Asia but has no activities in this area in Africa.

As far as WANA is concerned, aquaculture opportunities lie mainly in development of production systems in irrigation channels, optimizing marine cage culture, development of efficient polyculture. The WANA region also needs assistance in managing its coastal resources.

### 2.5.2 The Abbassa Regional Headquarters

The Abbassa regional headquarters was officially opened in May of 1997. The Government of Egypt donated the facility and associated equipment to ICLARM in 1995, and ICLARM assumed full management responsibility for the research facility in January 1998. A generous grant from the Government of Japan together with funds from other sources have permitted ICLARM to rapidly renovate the facilities and equipment to international standards. The renovation is proceeding on schedule.

It is important to put Abbassa in the ecological context of the whole region under consideration. Abbassa is on the northern ecological limit of warm water aquaculture (affecting farmable species as *Oreochromis niloticus*, *O. aureus*, *Tilapia zilli*). Actually it is at the ecological boundary between cold water and warm water aquaculture. There is of course some overlap and room for some eurythermal species (common/grass/silver carp, some chinese carps, some catfish, the indigenous mugilidae). For five months in the year, Abbassa experiences cold weather and there are severe risks of broodstock mortalities. The type of aquaculture practiced in Egypt also differs from

that of tropical Africa so the center is unsuitable for the investigation of integrated aquaculture-agriculture systems that would be applicable in the rest of the continent.

#### **2.5.2.1 Staff, budget, layout facilities**

The Abbassa facility has 2.5 IRS and some 90 Egyptian NRS, including scientists, professionals and technical staff. The Governments of Egypt, Japan and the United States, plus the Arab Fund currently are funding its base operations. Current operating and maintenance costs are running around \$ 1.2 million per year. It is noted that donors committed special additional funding to Abbassa which was not competitive with ICLARM core funding.

In addition to 2,400 sq.m of offices, research and training facilities on the 100 ha. site, the Abbassa facility has 160 production and research ponds, with appropriate supply and drainage canals and a secure source of water. It also has ample housing for trainees at the center, and renovated housing is being made available for visiting researchers. It has a 600 sq.m warehouse and standby power. The facility is well laid out, has adequate security, and it is reasonably accessible from Cairo (about 1.5 hrs. by car).

#### **2.5.2.2 Current activities at Abbassa**

Current activities in Abbassa cover the following:

- **Evaluating the diversity** between and within species of Egyptian tilapia, feed conversion ratios, morphometric and processing traits, seinability and response to factors such as low temperatures and salinity;
- **improving hatchery procedures** for mass production of catfish (*Clarias gariepinus*);
- **producing triploid grass carp** in collaboration with scientists from the Channel Maintenance Research Institute for weed control;
- **coordinating and expanding INGA** activities in the region;
- **organizing an international workshop** on the Lake Nasser fishery in Aswan to formulate plans for sustainable fisheries;
- **developing in-house information services** to service the needs of the scientists in the region;
- **providing support** for some national research projects; and
- **developing cooperation** with national research institutes and universities.

#### **2.5.3 ICLARM projects in the rest of Africa**

In addition to the Abbassa site, ICLARM currently has a very successful 15 year old integrated aquaculture-agriculture systems project in Malawi (See Box 2.5.1) and with funding from DANIDA ICLARM has incorporated co-management initiatives on Lakes Malawi, Malombe, Kariba and on the Mozambican coast under its "Coastal Fisheries Co-management - a World Wide Collaborative Research Project.

ICLARM also ran a successful project, along the lines of its research in Malawi, in Ghana (See Box 2.5.2) and recently completed another project in West Africa within the frame of the Biodiversity and Genetic Resources Program. This project showed the genetic variation of *Sarotherodon melanotheron*, a cichlid that is extensively farmed in West Africa. In association with this program, some training is being carried out in FishBase. A course has already been run in Namibia. Two more courses will be conducted in Senegal and Ethiopia.

#### **BOX 2.5.1 ICLARM'S MALAWI PROJECT**

The integrated aquaculture-agriculture system that has been adopted by the ICLARM field station in Malawi to promote small-scale fish farming is novel. The research is based on a map of farmers' farms, drawn by the farmers together with researchers. The whole farm becomes the unit of analysis. With the researchers, farmers figure out the flow of resources (including agricultural waste) from one farming enterprise to another. This exercise helps to develop an understanding of how and to what extent resources can be integrated on the whole farm. The farmers, with the researchers and extension agents, select the aspect to be studied and monitor bioresource flows and natural resources rehabilitation as well economic and sustainability of the systems. The approach has several advantages:

- Although it is driven from a fish farming perspective, it gives farmers a holistic view of their farms and indications of which enterprises give better economic returns and at what time of the year.
- Incorporation of fish farming enhances synergies between ponds and other agricultural activities. Vegetables, maize (in the dry season), fruits (bananas, paw paws, mangoes), sugar cane are grown under irrigation between the ponds
- It promotes farming systems transformations (farmers learn to integrate farming activities, and appreciate the costs and benefits of carrying out a particular farming enterprise).
- Furthermore, farming as an economic activity is extended beyond the rainy season, creating the potential for realizing household income all year round
- Farmers are taught to use local materials and to look at agricultural "waste" as a resource. The agricultural wastes utilized are rice bran, maize bran, maize stovers, rice stocks, manure (chickens, goats, cattle) and weeds. Local fish species are used.
- The system does not depend on external inputs of energy. Research shows that there is enough dry matter to feed a typical pond area of 700 sq. m. at any one farming unit. The system therefore enhances ecological sustainability and general efficiency.
- Decisions are made at the farm / village levels, avoiding top down prescriptions that do not meet the true needs of the farmers and communities.

The initial approach to aquaculture development initiated in 1985 was based on traditional prescriptive methods by a consortium comprising of GTZ, ICLARM and the University of Malawi through the Research for the Development of Tropical Aquaculture Technology Appropriate for Implementation in Rural Areas Project. The focus shifted to integrated farming approaches six years ago. The aim was to develop technology suitable to resolving problems faced directly by rural small holder farmers at their level of operation. This was to be developed in preference to imposing technologies developed elsewhere. In fact, use of the latter approach is a major reason why aquaculture has not been as successful as earlier anticipated in the African rural setting. ICLARM and the University were responsible for research and GTZ was responsible for extension. Between 1985 and today about 1,800 farmers have taken up aquaculture in the region where this Project is located. Adoption rates were initially slow but have picked up amongst the farmers.

#### **BOX 2.5.2 ICLARM'S ACTIVITIES IN WEST AFRICA: SOME EXAMPLES**

##### **i) Focus on integrated agriculture aquaculture systems**

ICLARM was involved in two projects in West Africa. Between 1991 and 1996 ICLARM teamed up with the Institute of Aquatic Botany of the Council for Scientific and Industrial Research (Ghana) and an NGO, the Ghana Rural Reconstruction Movement (GhRRM) to conduct some participatory research with small holder farmers in the Mampong Valley of Akuapem in Ghana. The Mampong Valley is in an area with seasonal rainfall and before the project was started no fish were grown in the area. The participatory approach was in the frame of the IAAS Program and along the lines of research carried out in Malawi based on synergistic interaction between pond, field and livestock. Altogether 12 farmers were involved. Within 3 years of the initiation of the integrated approach, gross income increased from USD 1,000.00 to USD 2,500.00. This was a result of increased enterprise diversity, and increased total farm productivity.



**Box 2.5.2 (continued)****ii) Focus on biodiversity and genetic diversity**

ICLARM also teamed up with the Institute of Aquatic Biology (Accra, Ghana), and the Zoologisches Institut und Zoologisches Museum, University of Hamburg (ZIM), Federal Republic of Germany to carry out research in a project:- Fish Biodiversity in the Coastal Zone. A case study of the Genetic Diversity, Conservation and Sustainable Use in Aquaculture and Fisheries of the Black-chinned Tilapia (*Sarotherodon melanotheron*) in West African Coastal Lagoons and Watercourses. The project was funded by GTZ and BMZ. Fish samples were collected from Senegal, Sierra Leone, Cote d'Ivoire and Ghana, Togo and Benin. The project was carried out in the period 1997 to 1999 within the frame of the Biodiversity and Genetic resources Program of ICLARM. The project used electrophoretic techniques.

The project demonstrated the existence of significant genetic differences among West African populations of *S. melanotheron*.

**iii) INGA activities in Biodiversity research in Malawi, Ghana, Cote d'Ivoire and Egypt**

ICLARM through International Network on Genetics in Aquaculture (INGA) is implementing a regional collaborative research and training project for documentation and characterization of genetic resources for aquaculture in Cote d'Ivoire, Ghana, Malawi and Egypt. Center National de Recherche Agronomique (Cote d'Ivoire), Water Research Institute (Ghana), University of Malawi and Central Laboratory for Aquaculture Research (Egypt) as partners in this project. Africa possess global wealth of freshwater fish biodiversity including tilapia genetic resources. Malawi alone has some 1,000 endemic fish species, some of which are endangered. The project is documenting tilapia genetic resources in these four countries including indigenous knowledge. The project activities (fishbase) are funded by IDRC.

**2.5.4 Suggestions for the Medium Term in Africa and West Asia**

The Panel considered available documentation, the results of its field visits to Malawi and the Abbassa site, as well as its discussions in Egypt and with other African country representatives and ICLARM officials. Based on this assessment, and given the perspective laid out in the beginning of this section, the Panel concluded that:

1. the Abbassa site has the potential to become a productive center for ICLARM activities in Africa and West Asia;
2. ICLARM also will need to have a node of operations and associated activities in the humid or subhumid regions of SSA, since Abbassa is not well suited for certain types of LARM research relevant for those regions, e.g., that related to integrated aquaculture-agriculture on small and medium size farms, a theme that is of high priority.

**The Panel recommends that ICLARM further develop its tactical plan for Africa and West Asia paying attention to the balance between activities that can be carried out at the Regional Headquarters and those that need to be implemented at research sites elsewhere.**

In developing its plan, ICLARM should actively seek input from a variety of stakeholders in the region, including inputs from existing and potential NARS collaborators and from other CGIAR centers. It also should keep uppermost in mind that work in Africa, including at Abbassa, is part of an overall global ICLARM program. Programs for Africa should continue to be regarded as an integral part of the ICLARM program as a whole.

**(1) For the Abbassa Regional headquarters:**

The Abbassa center could focus mainly on aquaculture, training, communication and information exchange activities that can benefit the whole of the Africa and West Asia Region. Some of activities in these areas are already being undertaken at the center. Specifically the center could conduct the following activities:

- **testing indigenous species for aquaculture potential.** Besides the use of cichlids, the catfish *Clarias gariepinus* offers tremendous potential for aquaculture.
- **genetic selection** for enhanced growth, disease tolerance, efficient conversion of feed, etc., for the selected fish species with aquaculture potential.
- **testing feed** for the various species with aquaculture potential.
- **training and extension** especially in terms of packaging extension material. The facilities are also suitable for formal training programs.
- **collection, synthesis and dissemination** of research data and findings from projects on the big inland lakes, rivers and aquaculture initiatives from the rest of the region.
- **Networking, communication and partnership with NARS.** ICLARM has a number of networks which could be linked to the proposed African network. This could make international information available to African research institutions.

The Panel notes that the current staffing of the Abbassa center does not yet include regionally recruited staff from SSA and other countries in the WANA region. This is a serious issue because of the implications for perception and ownership of the site throughout Africa.

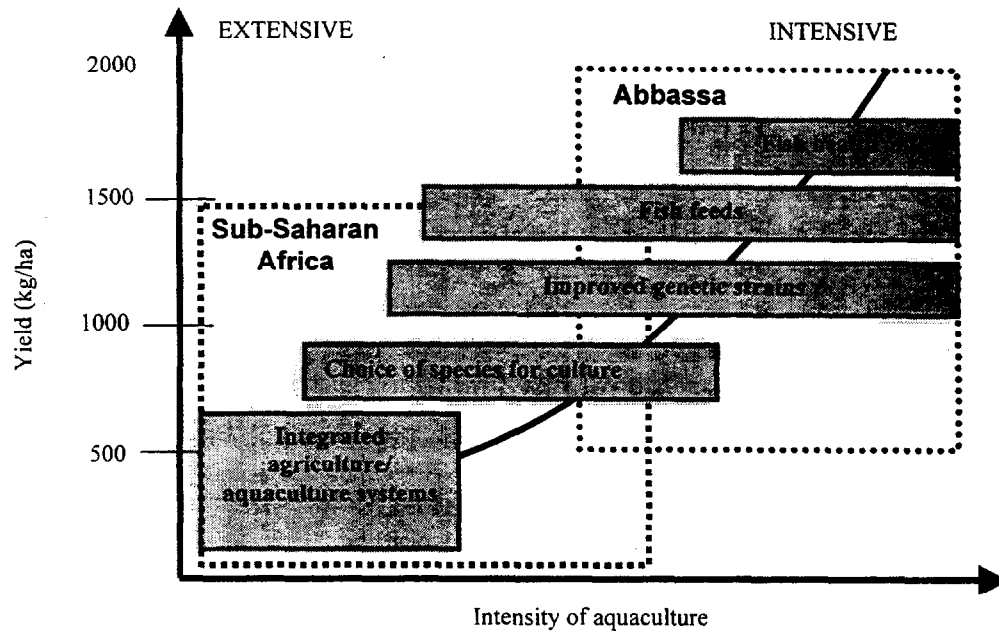
**The Panel recommends that steps be taken to ensure representation from other African and West Asian countries on the research and training staff of the Regional Headquarters for Africa and West Asia as a priority.**

**The Panel further suggests that representation of regional expertise may be increased by opening the Center for visiting scientists from other countries.**

**(2) For the rest of SubSaharan Africa, ICLARM could:**

- **define the future role of its Malawi facility** with the possibility of retaining this station as the focal point for on farm research under the IAASP; if it is retained, then its mandate should be extended to cover the development of integrated and co-management models that involve the participation of fishing communities;
- **establish close working relations with NARS groups and other CGIAR centers** in setting up and participating in effective, broad-based networks focused on farm diversification, where aquaculture may be one of the components. In this regard, the Panel strongly believes that ICLARM needs to expand its focus from a single successful project (Malawi) to a broader understanding of the processes of innovation and adoption of IAAS improvements in SSA. ICLARM needs to contribute to getting this type of successful effort underway in other areas. It must broaden out and focus on the international public good aspects of such work, since it is difficult to justify ICLARM involvement in a single, locally focused project dealing with IAAS. As one possibility, ICLARM might explore options to work more closely with ICRAF and the AFRENAs it has established and supported in various parts of Africa to promote farm diversification into agroforestry. The Center also should continue explorations with IITA and WARDA in West Africa.

The activities conducted from Abbassa and in SSA are not mutually exclusive. Both are an integral part of the overall ICLARM Program. The Malawi station and the Abbassa center must be seen as working in a complementary fashion on different parts of the same spectrum (Figure 2.5.1). The outreach site(s) in SSA would be working mainly on the field level activities at the lower left side of the figure, while the Abbassa center is positioned to service large scale aquaculture concerns, which can afford expensive feeds, broodstock, disease controls etc. In between there different levels of operation and different input requirements where both Abbassa and a sub Saharan node could make contributions.



**Figure 2.5.1.** Diagram showing the levels for various research topics related to the intensity of aquaculture and their possibilities for ICLARM on-station and on-farm programs in sub-Saharan Africa and Abbassa

The panel recognizes that ICLARM's work under the Programs AEP (management of coral reefs, integrated coastal zone management), BGRP (biodiversity and genetic resources research and monitoring, CASEP (stock enhancement), FRAMP (data bases and stock assessment) are applicable in the African context. In the future, ICLARM might wish to devote more attention to issues related to African coastal areas and West Asia

Into the more distant future, ICLARM could explore options to make productive contributions to fisheries work related to the large river systems of Africa. These rivers are major sources of animal protein for large segments of the population of Africa, and additional work on them certainly can be justified eventually. ICLARM has developed strength in this area through its work in Bangladesh and the Mekong.

In sum, the Panel commends ICLARM for the progress it is making in getting the Abbassa facility up and running and in its activities related to planning for work in Africa.

## CHAPTER 3 - CENTER-WIDE PROGRAMMATIC THEMES

### 3.1. Program Consolidation and Center-wide Strategies

ICLARM currently has 9 programs, 7 of which are research programs and 2 are cross-cutting programs in support of research. For a Center the size of ICLARM, the Panel felt that a simpler program structure might improve planning of work and integration of activities and enhance program effectiveness.

As it turned out, when the subject of consolidation was broached with ICLARM, management indicated that it had been thinking about ways to consolidate its programs. (Since the EPMP initial phase, this proposal has been put forth to Program managers, generally with positive reactions to the idea). Current thinking in the Institute views a possible five research and research related program structure, although considerable discussion still is needed to firm up a definitive proposal. The Panel strongly endorses this proposal.

#### 3.1.1 Program Consolidation

As ICLARM envisions the new structure, it might involve: (1) a biodiversity and genetic resources program (the current BGRP plus GEBP); (2) a coastal and marine research program (taking on much of the current work of the CASEP, AEP and FRAMP); (3) a freshwater production research program (the current IAASP activity plus the community based management work from PRIAP and inland waters fisheries and aquaculture work at Abbassa); (4) a policy research and impacts program (most of the PRIAP program); (5) a partnerships, information services and training program (activities related to current ITP and IPN programs). The five programs would each be managed by a scientific program manager working closely with the DDG-Programs. ICLARM envisions, and the Panel agrees, that new projects under such a structure should in general be larger, multiyear, involve greater cross-program interaction, and have impact assessment strategies built into their rationale right from the beginning.

The Panel agrees in general with ICLARM's initial ideas for a restructuring and consolidation of programs. **However, the Panel suggests that ICLARM weigh the pros and cons of separating out the network support, information, training, library, and public awareness functions and placing them in a support unit attached directly to the DDG programs or the DG to serve primarily as a focus for expertise for the research programs.**

The Panel believes that, in order to build a smooth, efficiently functioning and cohesive research program, it is necessary to put these functions in a unit that clearly is focused on complementing and cooperating with the research programs to ensure the effectiveness of the overall focused and targeting research and capacity strengthening needs of the Center.

The Panel believes that a new consolidated program structure should: (1) release valuable senior scientist time from administration and management; (2) foster improved understanding by stakeholders of how the ICLARM programs operate to accomplish its objectives; (3) improve the opportunities and rationale for interaction among programs and of scientists within different programs in pursuit of the overall objectives; (4) provide an opportunity to test a modified program management model involving closer linkages between DDG-programs and the program leaders; (5) have the potential to reduce overhead and transactions costs (although this remains to be analyzed);

The argument has been put forth by some that the existing program structure has not been in place long enough to warrant major readjustments now. The Panel believes that an institution's program should be a dynamic entity that responds to changing needs and demands; and that any rationalization of a program that increases its logic in terms of the overall mandate and goals of an institution is worth pursuing, regardless of how long an existing structure has been in place. The Panel considers that the timing over the next couple of years will be good for consolidation and change since (1) ICLARM will be moving headquarters and will, in any case, face some disruption; and (2) a number of the current program leaders are leaving ICLARM.

### **3.1.2 Center-Wide Strategies for ICLARM's Aquaculture Research and Social Science and Policy Research**

In support of the rationalization and consolidation of programs, there is a need to articulate strategies that lay out the linkages across programs of work in aquaculture and in social science and policy research. These are needed because of common themes running through the programs. For example, in the case of aquaculture, there are major elements in BGRP (genebanking and concepts of ownership of genetic material); GEHP (gene enhancement program); IAASP (whole program); CASEP (whole program); PRIAP (various projects related to policy and economics research); and ITP (related to publications, library, training, etc.). In the case of policy and social sciences, elements are included in most of the programs, yet they do not all have the resources to engage full time social scientists. Thus, opportunities for sharing and collaboration exist. In addition such a strategy is needed in order to clarify and set logical boundaries on the role of PRIAP in supporting the rest of the programs with policy research, impact assessment activities, and social science/economics research activities.

These strategy/policy statements would parallel the existing center wide strategy statement on training, which the Panel feels needs to be revised to be much more specific in terms of operational implications for the Center. **The Panel suggests that ICLARM produce Center-wide strategy statements on common themes that apply across programs.**

## **3.2 Regional Balance and Field Activities in ICLARM's Program**

ICLARM has moved relatively rapidly into a mode of decentralizing activities and expanding regional presence. At the present time, given the Abbassa site, ICLARM now has more personnel in the field than at headquarters. This situation raises several questions related to regional balance of ICLARM's programs. It also creates some different challenges for ICLARM, such as how to establish policies that can help avoid creation of a "we-they" environment, and establishing mechanisms and links between headquarters and the field sites that ensure effective two-way communication and participation in planning and operations.

### **3.2.1 Regional Balance Issues**

To date ICLARM has concentrated its efforts mainly in Southeast Asia and the Western Pacific. It has had some activities in Africa and the acquisition of Abbassa now creates an outreach site for the WANA region and for sub-Saharan Africa, which will enable considerable expansion of work in these regions. Other modalities such as outreach sites and collaborative programs with NARS and other CG centers also are being considered for sub-Saharan Africa.

Much of ICLARM's work particularly in Asia is carried out by catalyzing multi-country projects around common means of data collection and analysis for the drawing of strategic conclusions. Not all the work is regionally focused, e.g., the work in the Caribbean has relevance to coral reef conservation, management and use in all areas of the world supporting reef fisheries. Most projects administered from headquarters have regional/global relevance such as the GEBCO carps program which links six centers in Asia, FRAMP TrawlBase project (involving 8 countries), and BGRP FishBase training (with 5 regional nodes servicing 8 to 10 local centers each).

In Asia and Western Pacific, the Bangladesh and Solomon Islands projects are well established and have shown a number of successes. ICLARM's station in the Solomon Islands (Coastal Aquaculture Center - CAC) operates the entire Coastal Aquaculture and Stock Enhancement Program (CASEP), focusing on aquaculture of giant clams, pearl oysters and sea cucumbers. Its activities take full advantage of clear oceanic waters and the reef environment there and all staff in the CAC work for CASEP. The program's major thrust is restoration of overfished species stocks and the Center conducts research which generates primary data necessary for coastal aquaculture and stock enhancement. Its research direction is influenced by usefulness to grass-root levels (involving little technology) and benefits to local communities. CAC's current work with 26 giant clam farmers demonstrates the viability of this activity towards improved income. Its other projects on grow-out of black-lip pearl oysters and stock enhancement of sea cucumbers have also showed potential and convinced the Solomon Islands Government to prohibit exports unless the products have been derived from aquaculture. The major direct benefit from this research is income from village-based enterprises using the biotechniques developed. While field testing and demonstration is carried out in the Solomon Islands, the methodologies developed could be applied to developing small island nations throughout the Indo-Pacific in view of similar socioeconomic and biophysical settings. This strategy can be realized through its close working relationship with the Solomon Island Government, and its strengthening partnerships with the international and regional agencies such as the South Pacific Commission. (See Appendix IV-4.3).

ICLARM's Bangladesh site office is the coordination point for the Sustainable Aquaculture project which falls under the Integrated Aquaculture-Agriculture Systems Program. The Sustainable Aquaculture project is a major recipient of donor funds with a significant amount for partner NGOs to manage extension and monitoring activities. The project involves close collaboration with NARS and NGOs in the development of sustainable, low-external input integrated agriculture-aquaculture practices that fit into farming systems of Bangladesh. These efforts have resulted in many research and development activities on improved models and technologies for aquaculture management by farming communities in Bangladesh. Preliminary results indicate that ICLARM-introduced Integrated Aquaculture-Agriculture (IAA) technologies in the country showed economic benefit through poverty alleviation as well as improved household nutrition. PRIAP's activity on institutional capacity building for community-based fisheries management in Bangladesh is aimed at strengthening overall fisheries resource management.

Additionally, IAASP's project on increasing and sustaining the productivity of fish and rice in flood-prone ecosystem in South and Southeast Asia focuses on Bangladesh and Vietnam. The work conducted through the Bangladesh office will be compared with IAA activities in other parts of Asia (e.g., Mekong Basin countries) and Africa and lead to a synthesis of what works where and the underlying reasons across a range of agroclimatic, economic, farming systems and socio-cultural settings.

The Bangladesh site office effectively facilitates the expansion of a number of projects led from headquarters which involve networking with institutions in the region. These include GEBCO's work on genetic improvement of fish through the International Network for Genetics in Aquaculture and FRAMP's analysis of coastal fisheries.

The geographical distribution of ICLARM's current work leaves most of Latin America and the Caribbean (LAC) uncovered. At present ICLARM has a small activity in the Caribbean under the FRAMP. However, quite beyond the issues associated with protection of fragile marine ecosystems, Central America, the Caribbean and tropical South America all suffer from similar problems to Africa with regard to inland fisheries and aquaculture. Integrated aquaculture/agriculture and small dam management in these countries could benefit from ICLARM experience, as could ICLARM from the work being conducted on them. **The Panel suggests that, as the issues of aquaculture and fisheries are important in South and Central America, a policy for this continent be developed.**

ICLARM's work with the LAC region should not necessarily, initially at least, involve direct interventions through projects or programs, for reasons of economy and given ICLARM current priorities. However, linkages should be established with partners in Latin America to facilitate the exchange of experience and ideas. A policy for guiding expansion is needed.

### 3.3 Research Quality

Research is a process that incorporates (1) the identification of the topic to be investigated, (2) the planning and execution of the research itself, and (3) the outputs of the research in the form of publications, training and management advice. Quality issues surround all three of these. Quality of the planning and topic selection processes was covered in section 3.1. Here we focus on the other two stages.

The 1995 Mid-Term review of ICLARM expressed concern about possible limitations to the Center's in-house scientific capacity to carry out interdisciplinary international research. The review noted that such limitations were a result of poor funding levels and not any lack in the capacity of the staff. As a result TAC urged ICLARM to enhance its capacity through improved funding and to ensure that it maintains and expands strategic alliances with other research organizations. ICLARM revised its program structure in 1996 in an effort to rationalize its activities and improve its research capacity through better deployment of staff. It is currently considering consolidating the structure and is increasing definition of its areas for research in its strategic plan 2000-2020.

#### 3.3.1 Quality of Inputs

##### *Qualifications of research staff*

The employment status and qualifications of the research staff assigned to the various programs are listed in Table 3.1 and their major qualifications are listed in Table 3.2.

**Table 3.1. Qualifications of international and national scientific staff at ICLARM as of January 1999**

Category	Ph.D.	M.Sc.	B.Sc.
IRS	23	2	
NRS	12	34	9
TOTAL	35	36	9

Table 3.2. Specializations of scientific staff at ICLARM as of January 1999

AREA OF EXPERTISE	NUMBER OF QUALIFIED STAFF
Aquaculture	15
Biology	39
Chemistry	1
Computer science	4
Economics	9
Mathematics	1
Statistics	2
Social sciences	9

Research Staff are mainly biologically oriented, corresponding to the nature of biology, ecology, stock assessment, genetic and aquaculture programs to date. Given the changing orientation of the work of the Center towards social, economic and policy issues attention should be paid to the recruitment of suitably qualified sociological and anthropological researchers.

#### *Facilities and equipment*

The Center has no laboratory or pond facilities of its own at headquarters and has had to limit its activities to desk studies, analysis and development of software tools there. For field research it has to rely on pond and on-farm facilities at outreach sites and on collaboration with NARS. In late 1997 it also assumed responsibility for the facilities at Abbassa, Egypt, which, for the first time, has given ICLARM an independent research facility in Africa. Abbassa has been restored to a fully functional experimental farm that has good facilities for most aspects of modern experimental and commercial aquaculture. Whilst it is representative of the WANA region it does not respond fully to the needs of sub-Saharan Africa (as discussed in section 2.5.4).

### **3.3.2 Quality of the Research Process**

#### *Review procedures*

ICLARM has several mechanisms to assure the quality of science.

Controls during project formulation: The DDG/Programs reviews all project proposals. These are then referred to the Research and Management Committee and also to other Program leaders for scrutiny. In some cases project proposals are reviewed externally especially for large projects and where the donor agency provides for science review mechanisms.

Controls during research execution: The quality of research by individual scientists is included in the staff assessment process and all program leaders are so reviewed by the DDG/Programs twice a year as part of the personnel management process. All scientific programs are reviewed also at an annual scientific review, although no such review took place in 1998 due to time spent formulating the new strategic plan. External controls on research quality are also in place for most major programs. For example FISHBASE has an external steering committee. The GIFT program was regularly reviewed by UNDP, the RESTORE software has been externally reviewed and the genetics biodiversity programs are reviewed through FAO and other external collaborators and the CAC was reviewed by its donor (ACIAR). Workshops and Conferences are also used as mechanisms for regular review of quality of content of several research areas.



**Control of outputs:** No formal review mechanisms are in place other than scrutiny by the DDG/Programs, the Program Leaders and other scientific staff of any reports or other publications. Some projects do have a check on quality by the donor.

**The Panel recommends** that ICLARM establish explicit mechanisms for external review of the quality of its research at the various phases of its projects. Such review mechanisms should be indicated in project proposals.

**CCERs.** As indicated in section 2.4, an integral and independent approach to assessment of the quality of science is carried out by the CCERs. The Panel assessed these reviews and concluded that they were of high quality, done by recognized experts, and relevant for the purposes of the Center. Some programs were evaluated earlier through other types of internal reviews, through donor reviews or remain to be evaluated. Assessments of research quality made here were based on these and discussions with program staff and a review of project documentation.

### 3.3.3 Dissemination of Results

The results of the research programs of ICLARM appear mainly as publications either by ICLARM reports or in international peer-reviewed scientific literature. Two measures of success of the publications are available: the number of publications produced and the number of citations of the literature by independent scientists. The majority of ICLARM's work still appears in non-reviewed publications and conference proceedings. Numbers of publications have also been falling in recent years although the data from 1997 and 1998 are still incomplete. The number of refereed publications has remained more or less stable over the last four years while internal ICLARM publications were particularly numerous in 1995 and 1996.

Table 3.3. Numbers of publications categorized by type from 1994 to 1997

CATEGORY	1994	1995	1996	1997
INTERNAL ICLARM	34	64	97	42
Articles	14	55	28	11
Papers in Conference proceedings	14	4	50	17
Software	1	1	2	4
Manual	1	1	3	2
Others*	4	3	14	8
EXTERNAL Refereed	27	39	35	39
Papers in Journal	15	16	12	19
Papers in Symposium Proceedings	5	13	7	15
Book chapters	7	10	16	5
EXTERNAL Non-refereed	18	19	12	12
<b>TOTAL</b>	<b>79</b>	<b>122</b>	<b>144</b>	<b>98</b>

\* Brochures, Annual report, operational plan and other semi-technical papers.

The rise in numbers of internally published papers in those two years is attributable to delayed publications of conference proceedings from earlier years. Some activities, ECOPATH, stock assessment models and fish genetics formerly developed their concepts and disseminated their ideas through Center organized conferences and developed a backlog that had to be cleared. Citation analysis is a classically difficult tool to interpret but the total of citations of 631 contributions was

17,700 between 1978 to 1998 indicates a widespread acceptance of ICLARM approaches and conclusions by many external institutions throughout the world. ICLARM paper on fish genetics, ECOPATH and FISHBASE are regarded as key references and working tools in their disciplines and are in particularly high demand.

Results of some activities, such as those involving the breeding of new strains of fish, and those involving the development of better methods for extension and policy making are better judged through their adoption by government extension programs, fish farmers and others involved in fisheries management. Mechanisms for this type of assessment are still being developed through PRIAP and results in this category remain in the whole anecdotal.

#### **3.3.4 Overall Assessment of Research Quality**

Overall, evaluations have shown that ICLARM has performed well in the formulation and execution of its scientific programs. It has carried out work in the fields of stock assessment, rural aquaculture and fish genetics which have been accepted as leading contributions in their respective fields. It also has developed and maintained two databases which are widely used and form the basis for future developments in their areas. The adoption of ICLARM approaches to biodiversity and genetics, and multi species fisheries and community energy flow by other international and national research institutions may also be viewed as an endorsement of their quality.

In particular, the Panel believes that:

- (i) ICLARM has responded well to the concerns expressed by the MTR with respect to possible limitations to its in-house scientific capacity to carry out interdisciplinary international research.
- (ii) On the whole ICLARM has adequate procedures in place to assure the quality of science at the formulation and execution phases, although its assessment of outputs could still be improved through external refereeing.
- (iii) According to available evidence research is of good quality. Most contributions conform to scientific rigor in design and execution. In the few other cases where CCERs or other external mechanisms have identified poor formulation of goals, research design and assessment ICLARM has moved rapidly to rectify the problem.
- (iv) The Center's research results and methodologies are expressed in publications that are widely disseminated and quoted by the global scientific community.

#### **3.4 External Linkages and Relations**

ICLARM has had collaborative undertakings in research and research-related activities with over 300 partners worldwide for the past 20 years. In 1998, ICLARM had collaborative links with 140 organizations and scientists from over 35 countries. Through its partnership and collaborative relations with institutions in different sectors, ICLARM has successfully harnessed partners' synergistic and complementary strengths and thus, has been able to deliver high quality output despite tight financial, staff and resource constraints. For its part, ICLARM has provided its partners solid technical expertise and research capacity strengthening support and has shared with them a significant measure of its prestige and scientific credibility (Refer to section 3.6).

### 3.4.1 ICLARM's Program and Policy on Partnerships

The International Partnerships and Networks Program deals specifically with ICLARM's partnership activities and their promotion and operations (This program is reviewed in Appendix IV, Section 4.7). The principles guiding ICLARM's engagement with partners are spelled out in its *Policy on Partnerships in Research and Related Activities* and *Policy on Private Sector Partnerships*. Additional guidelines are contained in its *Researchers Code of Conducts and Towards Guidelines for Running Multi-country, Multi-site Projects*.

### 3.4.2 Nature of Collaborative, Partnership Activities

Through partnership, ICLARM is able to draw on the resources of collaborating institutions to make up for its current lack of headquarters research facilities. This process allows ICLARM to contribute directly to the improvement of research capabilities of partner institutions and simultaneously train national scientists in developing countries and do its own research. For example, the research facilities (laboratory, ponds, etc) for the *Genetic Improvement of Farmed Tilapia (GIFT)* Project were based at Central Luzon State University (CLSU) grounds and provided jointly by CLSU and the Philippine Bureau of Fisheries and Aquatic Resources (BFAR), another collaborator in the project. This partnership, which also included the Institute of Aquaculture (Norway), received the CGIAR Chairman's Excellence in Science Award for Outstanding Partnership during the 1998 International Centers Week.

ICLARM also undertakes research and capacity building in partnership with NARS in various developing countries and advance research institutes (ARIs) through networking. For example, through the International Network on Genetics in Aquaculture (INGA), 19 research institutions from 9 countries are participating in projects on genetic improvement of aquaculture species.

As part of its NARS capacity building activities, ICLARM also has collaborative partnerships with NARS, academic institutions and ARIs to train young scientists, including graduate students pursuing advanced degrees. The *ICLARM Implementing Guidelines on Plans and Policies for the Recruitment of Young Scientists from Developing Countries*, reflects the policies on accepting young scientists from developing countries who wish to further their training in aquatic resources management research.

In addition, ICLARM has a policy of continuing to work with former staff members in advanced academic institutions through an alumni policy. In this way it has established links with the University of British Columbia for further development of ECOPATH and FISHBASE.

### 3.4.3 ICLARM's Network Activities

ICLARM coordinates international networks such as INGA, which address discipline-based issues on management and sustainable development of living aquatic resources through research and information dissemination at regional and international levels. INGA has clearly shown that research issues of global and regional importance are better addressed through networking, rather than working individually, thereby ensuring wider sharing of research results and benefits. ICLARM helps network members crystallize and synthesize ideas and develop proposals for funding. With ICLARM's facilitation INGA members have formed multi-disciplinary research teams of biologists and social scientists and initiated regional projects in Asia Pacific and Africa. These include the *Genetic Improvement of Carp Species in Asia*, which involve members from Bangladesh, China, India, Indonesia, Thailand and Vietnam, and *Characterization and Documentation of Tilapia Genetic Resources for Aquaculture in Africa*, which involves institutions from Côte d'Ivoire, Egypt, Ghana and Malawi. Such partnerships have attracted the interest of ARIs in developed countries as evident from 11 ARIs joining INGA as Associate Members in 1997.

In the field of social science, ICLARM also established the Asian Fisheries Social Science Research Network (AFSSRN) which has 14 member institutions from five countries. AFFSRN conducts collaborative regional research for enhancing social science research capabilities relative to aquatic resources management. The network has been very successful in capacity building in member countries, as a result the management of the network has been transferred to a national institution in Malaysia.

ICLARM also coordinates the Network of Tropical Aquaculture and Fisheries Professional (NTAFP), an information and publication exchange network with membership of over 2000 scientists from 130 countries.

#### **3.4.4 Linkages with other CGIAR Activities and Centers**

The CGIAR has identified five regional agriculture research fora for ensuring a stronger reflection of the collective views of NARS in CGIAR priority setting: improving modalities for developing formal partnerships between IARCs and NARS; strengthening NARS; collaboration and representation in the CGIAR; and enhancing institutional capacity building at national and regional levels. Fisheries does not generally find a place in these regional fora. In view of this, ICLARM is trying to bring in aquatic resource management issues into these fora by putting in place fisheries subgroups in each of the regional fora, starting with the Asia-Pacific Association of Agricultural Research Institutions (APAARI). Given the importance of fish in food security and poverty alleviation for major portions of the world's poor, the needs for additional ICLARM input into these fora should be a priority consideration for the CGIAR and ICLARM.

ICLARM has been undertaking research projects in partnership with individual CG centers, for example, with IRRI in improving productivity of rice and fish in deepwater ecosystem and with IFPRI in policy research. In addition, ICLARM participates and contributes to three Systemwide Programs. An ICLARM staff member has chaired the Systemwide Genetic Resources Program. ICLARM also participates in the Systemwide Program on Property Rights and Collective Action, managed by IFPRI. ICLARM contributes its experience and insights related to co-management and community institutions. The property rights issues faced by fisherfolk have many parallels to the issues faced by others dealing with common property management. A less active role is played by ICLARM in the Systemwide Program on Water Management headed by IIMI with strong support from IFPRI. ICLARM has the potential to build further on its existing links in the CGIAR system, particularly with regard to rurally oriented activities such as the IAASP which could be expanded to include ICRAF, and the introduction of aquaculture into farming systems of humid West Africa with WARDA or IITA.

#### **3.4.5 Linkages with Non-CGIAR Public Institutions**

ICLARM has closely collaborated with FAO in research, training and database generation. FAO is represented on ICLARM's Board. ICLARM has also been working in partnership with FAO and other international fisheries organizations in setting its research priorities and policy directions for developing countries. The relations between FAO and ICLARM are considered to be excellent.

Currently ICLARM has links with major regional and global organizations and programs engaged in aquatic resources research and management. These include the Network of Aquaculture Centers in Asia-Pacific (NACA), Southeast Asia Fisheries Development Council (SEAFDEC), Strategy for International Fisheries and Aquatic Research (SIFAR), Global Coral Reef Monitoring Network of the World Conservation Union (IUCN), and the Intergovernmental Oceanographic Commission of UNESCO and UNEP. ICLARM recently developed a collaborative project with the Secretariat of the Pacific Community (SPC) for the dissemination of research results and technologies developed through CASEP to other countries in the South Pacific.

### **3.4.6 Linkages and Relations with the Private Sector and NGOs**

The private sector is an increasingly important player in fisheries and aquaculture in developing countries. Part of ICLARM's future strategy is to engage in mutually beneficial partnership with the sector to enhance the delivery of the Center's mission. ICLARM sees private sector partnership as a means to further its own research, help disseminate its research products and results, and as a source of financial and resource support. However, while promising significant benefits, partnership with the private sector will be fraught with the challenge of reconciling the sector's profit motivation with ICLARM's charter to produce international public goods.

ICLARM's Policy on Private Sector Partnership spells out the principles and strategies that will govern dealings with the sector, and keeps in perspective the intended beneficiaries of its work. The policy statement also includes some of the considerations safeguarding ICLARM's interactions with private sector organizations, NGOs and other partners, especially with respect to proprietary technology.

### **3.4.7 Panel Assessment**

ICLARM has been able to develop goodwill and to forge open and smooth professional and personal interactions with partner scientists and institutions. ICLARM has provided both the stability of institutionalized partnership as well as a "human face" to these interactions through committed, highly professional research staff who are valued by their partners for their ideas, technical assistance and network facilitation.

ICLARM's clearly defined agenda and policies for partnerships have dispelled ambiguities, especially in its role relative to non-CGIAR public international research institutions. Partners especially noted and appreciated ICLARM's move over the past three years to a more consultative approach to its own research priority setting and strategic plan formulation.

ICLARM's partnerships promise significant research pay-offs in the long term; however, they also represent actual demands on current staff time and resources. Thus, ICLARM will need to find an appropriate and flexible balance to enable it to take advantage of narrow windows of opportunity for significant impact without overstretching its resources and adversely affecting the quality of its research programs. Where appropriate, ICLARM should also consider devolving some of its responsibility for servicing networks that have matured.

The Panel also urges caution in selecting partner institutions. ICLARM will have to put in place effective systems to monitor collaborative activities and mutually accountable and enforceable working agreements to help ensure that collaborators indeed adhere to agreed policies.

## **3.5 Databases**

ICLARM's information collection function has resulted in the storage of large amounts of data in electronic format.

### **3.5.1 Databases held by ICLARM**

ICLARM is now responsible for the following:

- FISHBASE (BGRP) which is an extensive database containing material on over 20,000 fish species
- LARVALBASE (BGRP) a new database providing a global information system on fish larvae as an input to FISHBASE

- TRAWLBASE a new database for collecting and analyzing trawl survey information (FRAMP)
- REEFBASE a database on the world's coral reefs (AEP)
- Database for the assessment of developing country fisheries (PRIAP)

There is an increasing trend to link the various databases through research oriented protocols which further integrate them with tools such as ECOPATH. These linkages further enhance the value of the original elements both as research tools and repositories for global information in LARs.

### **3.5.2 Quality of Content**

Three of the databases are relatively new so it is only possible to assess ICLARM's approach to data collection and storage by the two that are established.

REEFBASE has been subject to review in August 1998 as part of the ICER on the Aquatic Environments Program (AEP). This review found the database to be highly relevant to global concerns about these fragile ecosystems. On the whole the data input level is high and includes submissions by voluntary adherents to the aquanaut program. Although every attempt has been made to ensure a scientific approach to data gathering in this way, much of the material remains anecdotal and the ICER cautioned that references and information should be checked for accuracy. It also felt that the database could be expanded to include other indicators of reef health. ICLARM recognized these concerns and is acting to rectify them.

FISHBASE has never been formally reviewed although it was commented upon in the 1994 ICER of the former Coastal and Coral Reef Resources Program. The database claims to have incorporated 20,000 of the 25,000 species of fish. Concern has been expressed by members of the scientific community as to the selective manner in which data has been incorporated into the database in that it opted for total coverage in its earlier phases. The inclusion of data on finfish only and the relative lack of information on cultured fish have been seen as limiting the utility of the database. It could also usefully be extended to include data on molecular genetics. These issues are being addressed by ICLARM in present and future expansions of the database

### **3.5.3 Significance of Databases**

REEFBASE is considered a highly significant and powerful tool that can be used in managing and assessing the health of these environments. Some 1,650 copies of REEFBASE have been circulated and demand is rising. The REEFBASE website has accumulated about 13,000 hits since its inception in late 1996.

FISHBASE is highly appreciated and much used by the fisheries community worldwide. There are 1,400 registered CD owners in 128 countries, 330 collaborators in 66 countries and the website records about 100 sessions of 10 minutes per day. It is a unique compilation of data, which has now reached the critical mass necessary to allow it to be used for complex analyses. FISHBASE is a key component of the future expansion of FRAMP and outside institutions fishery assessment programs through linkages with ECOPATH, REEFBASE and GIS systems. The database has also been selected as the fisheries component of Species 2000 for the CBD which will be funded through the GBIF, an OECD project.

The two databases have facilitated collaboration with other national, regional and international agencies working in their fields of interest. They also interact with other databases contributing to active networking of information globally.

### 3.5.4 Policy and Administrative Implications

ICLARM's success in building two very large databases has been largely dependent on its location in a country that can provide economically technically competent personnel for inputting the large amounts of data. Continuance of these activities will depend very much on continued access to such expertise.

Databases tend to take on a life of their own and swell to reflect the data available and the demands made of them. They, therefore, represent a long-term commitment on the part of the host agency. The two large databases should now be regarded as global intellectual property. As such they should not be discontinued nor should they be subject to the contingencies of project funding. Should funding issues make it impossible for ICLARM to service the databases alternative hosts would have to be found. However, discontinuance or disposal of these databases should only be done in consultation with ICLARM's collaborators. For example a considerable portion of the material incorporated into FISHBASE is subject to an agreement between FAO and ICLARM which may be voided by transfer to an alternative host.

**In view of the issues surrounding important collections such as these, the Panel suggests that ICLARM define its policy with regard to existing databases and to any new ones that may be developed paying special attention to its long term responsibility.**

## 3.6 Capacity Strengthening and Training

Building and strengthening the capacity of NARS and other partners through collaborative research, training and networking are key elements of ICLARM's work. Apart from being important vehicles for partners' capacity building, training and networking are also strategic complements to ICLARM's own research agenda which have served to accelerate and multiply its research impact.

### 3.6.1 Collaborative Research

Collaboration with ICLARM has facilitated NARS scientists' access to vital information, linkages with other scientists and research institutions abroad, and opportunities for professional development and exchange (See section 3.4). Although ICLARM does not provide scholarships and fellowships, through the weight of its recommendation, it has been instrumental in securing fellowships for post-graduate studies or advanced training for many NARS scientists. For example, 5 out of 35 faculty members of the University of the Philippines (Visayas) College of Fisheries, the premier fisheries college in the Philippines, were able to pursue their advanced graduate degrees through ICLARM's intermediation.

Collaboration with ICLARM has also helped researchers from partner institutions to publish through joint authorship, although co-authorship by ICLARM staff and their NARS collaborators represent only a small proportion of the publication output of ICLARM. During the period from 1994 to 1997, between 15% and 33% of ICLARM's annual publication output had non-ICLARM co-authors. Most of these were co-authored by partners from universities and advanced research institutions. Joint authorship with NARS partners during the same period made up only between 1% and 6% of ICLARM's annual publication output (Table 3.4A). NARS authors' contributions made up only 5% of articles published in *Naga* (Table 3.4B). However, contributions from NARS authors make up a significant part of ICLARM published conference proceedings. A review of published proceedings show that NARS individual or joint contributions accounted for 11% to 54% of conference papers (Table 3.4C).

### **3.6.2 Networking**

Formal and informal networking has typically accompanied ICLARM's collaborative research and training programs (See section 3.4). As part of its training and networking activities, ICLARM has organized a number of study tours and exchange visits to partners' research sites. The professional and personal relationships forged through these exchanges over the years have greatly contributed to building institutional linkages among partners and have catalyzed the emergence of a critical mass of researchers and professionals engaged in fisheries research and development. In many cases, they became the basis for long-term collaborative programs among participating institutions.



**Table 3.4A. NUMBER OF ICLARM STAFF PUBLICATIONS/CONTRIBUTIONS, 1994-1997 (n=395<sup>1</sup>)**  
(Source: ICLARM Annual Reports)

Category	ICLARM Authors Only					Co-authored with NARS					Co-authored with Other Res. Inst./Univ.				
	1994	1995	1996	1997	Total	1994	1995	1996	1997	Total	1994	1995	1996	1997	Total
<b>INTERNAL ICLARM</b>															
Articles	12	50	20	10	92			2		2	2	5	6	1	14
Papers in Conf. Proc.	13	4	19	11	47			17	4	21	1		14	2	17
Software	1	1	2	4	8										
Manual	1	1	2	1	5				1	1			1		1
Others <sup>2</sup>	4	2	6	5	17		1	7	1	9			1	2	3
<b>Sub-total</b>	<b>31</b>	<b>58</b>	<b>49</b>	<b>31</b>	<b>169</b>		<b>1</b>	<b>26</b>	<b>6</b>	<b>33</b>	<b>3</b>	<b>5</b>	<b>22</b>	<b>5</b>	<b>35</b>
<b>EXTERNAL Refereed</b>															
Papers in Journal	9	11	8	10	38	6	1	2	3	12	4	4	2	6	16
Papers in Symp. Proc.	4	9	3	9	25	1	1	1	1	1	1	3	3	5	12
Book Chapters	3	9	10	3	25		1			2	3		6	2	11
<b>Sub-total</b>	<b>16</b>	<b>29</b>	<b>21</b>	<b>22</b>	<b>88</b>	<b>7</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>15</b>	<b>8</b>	<b>7</b>	<b>11</b>	<b>13</b>	<b>39</b>
<b>EXTERNAL Non-refereed</b>															
	6	15	9	10	40	9		1	2	12	3	4	2		9
<b>Sub-total</b>	<b>6</b>	<b>15</b>	<b>9</b>	<b>10</b>	<b>40</b>	<b>9</b>		<b>1</b>	<b>2</b>	<b>12</b>	<b>3</b>	<b>4</b>	<b>2</b>		<b>9</b>
<b>GRAND TOTAL</b>	<b>53</b>	<b>102</b>	<b>79</b>	<b>63</b>	<b>297</b>	<b>16</b>	<b>13</b>	<b>30</b>	<b>11</b>	<b>60</b>	<b>14</b>	<b>16</b>	<b>35</b>	<b>18</b>	<b>83</b>

<sup>1</sup> Number of ICLARM publications/contributions per year:

1994 = 71

1995 = 119

1996 = 119

1997 = 86

<sup>2</sup> Include Annual Report, Brief, Brochure, Operational Plan, and other semi-technical publications, i.e., Education Series.

Table 3.4B. AUTHORSHIP OF ARTICLES IN NAGA (1994 – 1998)

Publication	Total no. of papers/articles	AUTHORSHIP						
		ICLARM authors only	NARS	Joint with Other inst./univ.	NARS/Other inst./univ.	NARS	Non-ICLARM Other inst./univ.	NARS/Other inst./univ.
Naga 1994, Vol. 17	52	10		3		1	36	2
Naga 1995, Vol. 18	53	11		2	1		37	2
Naga 1996, Vol. 19	53	6		4		1	40	2
Naga 1997, Vol. 20	42	6		1			35	
Naga 1998, Vol. 21	41	3		3		2	32	1
<b>TOTAL</b>	<b>241</b>	<b>36</b>	<b>0</b>	<b>13</b>	<b>1</b>	<b>4</b>	<b>180</b>	<b>7</b>

Table 3.4C. AUTHORSHIP OF ARTICLES IN CONFERENCE PROCEEDINGS PUBLISHED BY ICLARM

Publication	Total no. of papers/articles	AUTHORSHIP						
		ICLARM authors only	NARS	Joint with Other inst./univ.	NARS/Other inst./univ.	NARS	Non-ICLARM Other inst./univ.	NARS/Other inst./univ.
<b>Conference Proceedings</b>								
<i>The Third International Symposium on Tilapia</i>	81	8	5	4	1	8	45	10
<i>Biology of Tropical Groupers and Snappers</i>	36	1		1		2	30	2
<i>Status and Management of Tropical Coastal Fisheries in Asia</i>	13	3	1	1		6	2	
<b>TOTAL</b>	<b>130</b>	<b>12</b>	<b>6</b>	<b>6</b>	<b>1</b>	<b>16</b>	<b>77</b>	<b>12</b>

### 3.6.3 Training

Through training, ICLARM has sought to develop skills, increase knowledge, change attitudes, create understanding, generate awareness, and build confidence among its target clientele. Most of the training organized by ICLARM have been in the form of technical assistance to NARS and other collaborating institutions as well as skills enhancement for visiting specialists, advanced graduate students, and field project implementers, including NGOs and people's organizations. There has been no consistent, consolidated and systematic recording of information on participants in ICLARM's various training programs. Based on retrospectively collected information, however, it is estimated that ICLARM trained about 200 individuals "on-the-job" and almost 7,000 participants, more than half of whom were women, through more than 200 group training activities between 1994 and 1998 (Table 3.5). However, most of these (107 training activities and 4,597 participants) could be attributed to the USAID-funded Sustainable Aquaculture Project which was primarily oriented towards aquaculture extension which provided training to farmers, NGOs and extension workers.

Table 3.5. COLLATED ICLARM TRAINING DATA

Year	No of group training activities	# of female participants	# of male participants	Subtotal of group training participants	No. of individuals trained on the job	# of female participants	# of male participants	Total of all trainees
1994	(a) 49	1,135	927	2,062	26	10	16	2,088
1995	33	564	369	933	(b) 57	28	19	990
1996	(c) 42	672	525	1,197	7	0	7	1,204
1997	(d) 48	582	590	1,172	35	4	31	1,207
1998	(e) 49	696	805	1,501	56	22	34	1,557
Total	221	3,649	3,216	6,865	181	64	107	7,046

- (a) 4 group training activities don't have records of no. of participants nor male and female percentage  
 (b) 10 group training activities don't have records of no. of participants nor male and female percentage  
 (c) 5 group training activities don't have records of no. of participants nor male and female percentage  
 (d) 2 group training activities don't have records of no. of participants nor male and female percentage  
 (e) 4 group training activities don't have records of no. of participants nor male and female percentage

Training programs have been mostly in conjunction with project-related research, often conducted at outreach sites, and supported by project funds. In the Philippines and Bangladesh, ICLARM has teamed up with NGOs and government departments in providing training. Capacity building effort has also focused on training trainers in the application of analytical frameworks and techniques and in the use of software and databases developed by ICLARM. Currently, ICLARM coordinates a large scale effort to train the NARS of 55 countries in the African, Caribbean and Pacific regions in fisheries and biodiversity management using Fishbase and ECOPATH. The training programs, which are conducted at designated regional nodes, are meant to ensure that these biodiversity assessment tools are appropriately used by NARS in these regions. ICLARM has also collaborated with FAO and DANIDA in training NARS scientists in stock assessment methods.

These training programs on the use of tools for tropical multi-species fisheries management directly relate to the CGIAR's goals of capacity building for conservation and sustainable use of natural resources. Such training programs are also probably among the very few opportunities available to NARS scientists in these developing countries to be exposed to, and to develop

competence in, the application of these software and databases for multi-disciplinary and ecosystem-based fisheries management (see Section 2.3.3).

### 3.6.4 Plans for Structuring the Training Function

The 1992 EPMR and the 1997 CCER on ICLARM's Structure noted the need for ICLARM to have a training strategy to better serve the needs of its clients and to sustain the long-term impacts of its projects. The 1992 EPMR also endorsed integrating information, training and NARS strengthening into one program. Since 1995 the Board has urged ICLARM to give more systematic attention to training and to make training more strategic rather than simply an activity within individual projects. The Board also urged the establishment of a single focal point for training within the Center. Following the 1996 reorganization, a training unit was created but because of budget constraints, it was allocated neither funds nor staff. The 1997 CCER on Structure saw no necessity for a training unit but pointed to the need for ICLARM to articulate a training policy.

The Center now has in place a "Training Strategy" which consists of a "Training Policy" and a "Training Plan". ICLARM plans to continue to give training high priority within its projects and to develop training courses in collaboration with ISNAR as part of its NARS strengthening agenda. Research-related training would continue to be conducted by ICLARM's subject matter specialist. General training in aquatic resources research and management, to be provided on the basis of need and funding availability, may be conducted with the assistance of professional educators or training specialists. At the most recent Board meeting, the responsibilities for a senior level NRS training specialist position within ITP was outlined. The training specialist will serve as a resource person to ICLARM staff on instructional design, training methodologies, curriculum development, and use of new instructional technologies. This position will also serve as the focal point for collection of ICLARM training-related information.

### 3.6.5 Panel Assessment

Although quantitative data is inadequate to fully assess the effectiveness and impact of ICLARM's capacity-building efforts, discussions with ICLARM's long-time collaborators and partners in the Philippines and in outreach sites indicate that ICLARM has been able to achieve strongly positive capacity building impacts. ICLARM's impact has been felt in the area of scientific research-related capacity building as well as in the policy arena.

The Panel concurs with the Center's present plans to continue to locate the training function within projects, provide expert training assistance, and create a central location for training-related information and records. **The panel urges ICLARM to translate its training strategy into an operational plan for implementation as soon as possible.** This would help ICLARM to better prioritize its training activities in line with its strategic mandate.

The Panel notes with concern that ICLARM's extensive collaborative research and capacity strengthening activities with NARS do not seem to be proportionally reflected in actual ICLARM-NARS joint publications output. Participation of NARS collaborators in publications should be part of capacity strengthening associated with ICLARM's programs.

## 3.7 Intellectual Property Rights with Regard to Genetic Resource and Biosafety Issues

ICLARM is involved with creating and disseminating new strains of fish for aquaculture under its GEBP and with genetic diversity issues under BGRP. These have implications for intellectual property rights in that new strains are being developed and original material is being taken from natural environments in member countries. The only such strain to be produced so far is the GIFT tilapia which has now been passed to a non-profit making foundation for distribution and

further development. The DEGITA project evaluated the strain in Bangladesh, China, the Philippines, Thailand and Vietnam where it was found to significantly increase yields in trial ponds. As a result, dissemination of the fish is proceeding in these countries. Royalties were not paid on the acquisition of the original material as countries participating in the experiment donated this. Equally, royalties are not charged either by ICLARM or by the GIFT Foundation as the new strain is viewed as a public good. Fry are sold by the Foundation to cover costs of production and research to improve the strain.

ICLARM intends to expand its program for selective breeding by addressing other species in Asia, principally carps, and for the WANA and sub-Saharan African regions. In all cases the same approach of free supply of source material by donating countries and free distribution of the resulting material is advocated, although a small charge may be levied to cover rearing and distribution costs. Wherever possible, viable strains, once developed, should be passed to the national or private sectors (including small-scale hatcheries) for further development and dissemination. Inevitably, however, questions of IPR will arise in the future as more productive or environmentally adapted strains of fish and other aquatic organisms are developed for the aquaculture sector.

The issue of biosafety is closely linked to IPR and ICLARM should be seen to be applying the highest standards to both in pursuit of its own programs. The Panel therefore supports ICLARM's preparation of a policy statement on IPR in line with those of other CGIAR Centers. It also endorses the statement contained therein that "ICLARM will assist, encourage and participate in partnerships in order to integrate ethical concerns into research on aquatic genetic resources conservation and use. While not completely eliminating the option, as a principle ICLARM will not normally seek intellectual property protection on any genetic material in its collections or those generated from its breeding activities. Research collaborators and others that receive such non-protected genetic resources from ICLARM will be required to observe the same conditions. In biotechnology-oriented collaborative agreements, ICLARM will meet biosafety standards and will include clauses designed to ensure that its collaborators meet such standards, especially concerning quarantine and environmental protection".

The proposal to hold an International Conference on biosafety issues in fisheries and aquaculture is strongly supported.

## CHAPTER 4 - GOVERNANCE AND MANAGEMENT

The Center's governance, management, administration and finances are rated highly. There are excellent policies, guidelines, procedures and practices in place. As the Center transitions to a new headquarters site, there will be significant and time-consuming issues that will arise, but the Center has thought these through and has good systems in place that should position it well for the future. The overall structure and governance of the Center are outlined factually and succinctly in the Center prepared document ICLARM Structure and Governance. ICLARM is a relatively small Center, with 321 staff in 1998, of whom 28 are IRS. An overview of actual and proposed staffing and financial patterns at ICLARM from 1994-2001 is provided in Table 4.1.

### 4.1 Board of Trustees

#### 4.1.1 Composition and Structure

ICLARM has a relatively small Board of twelve voting Trustees. Nine are elected members and three are ex-officio members (country representatives from the Philippines and Egypt and the Director General). In addition, the Director General of FAO nominates a representative who participates fully in Board matters, but without the right to vote. Elected members serve a first term of no more than three years and are eligible for a second term, also of no more than three years. There is excellent diversity on the Board on all dimensions (nationality, age, gender, north-south distribution, and most disciplines including finance and administration) particularly given that only nine members are elected at large (see Appendix V). Board meetings are held twice a year; on average two members are absent from each meeting.

Board committees are structured in a traditional manner with Executive, Audit, Program and Nominating Committees, plus ad hoc committees as circumstances dictate. The Board Chair serves ex-officio on all committees and does indeed participate actively in each. Board members are encouraged to make field visits on the way to Board meetings, and to report to the Program Committee at the next Board meeting. In areas where the Board feels additional expertise is needed, resource persons are invited to attend Board meetings.

#### 4.1.2 Board Performance

The Board benefited from the outstanding leadership of Professor John Dillon and the late Dr. Laurence Stifel who took over as Board Chair and interim DG respectively at the time of ICLARM's leadership crisis in 1993. Many of the excellent practices now in place were begun by them. The current Board exemplifies a commitment to excellence, innovation and transparency in how it approaches its responsibilities. This is reflected in a variety of ways, from its Board Mission and Code of Conduct statements, to its attention to continuous improvement as a Board and in the enthusiasm it brings to extracurricular Board activities. It carries out its oversight functions well. This performance is a reflection on the Chair, the Board members themselves, and the staff who provide the documentation and information that supports the Board's deliberations. Appropriate issues are brought before the Board, the documentation provided is relevant and sufficient for responsible decision-making, and suitable oversight is exercised on financial and administrative aspects. Excellent Board procedures, carefully documented, are in place and are followed. The Board meetings are chaired effectively and inclusively. An effort is made to consider all Board members for leadership roles. The Committees, too, function effectively with well-documented procedures, analyses, and conscientious leadership and followership. There appears to be frequent and easy interaction between the Board and Management. The Board Chair visits the Center between Board meetings; the Director General provides fortnightly information reports to the Board.

TABLE 4.1 ICLARM AT A GLANCE

	Actual				Unaudited	Est'd	Projected	
	1994	1995	1996	1997	1998	1999	2000	2001
<b>A. STAFFING LEVELS ( Positions)</b>								
Internationally Recruited Staff	21	22	27	30	28	33	37	42
Post Doctoral, Associates, Visiting	5	1	1	2	2	5	6	6
Nationally Recruited Staff	169	170	198	187	291	270	310	310
	<b>195</b>	<b>193</b>	<b>226</b>	<b>219</b>	<b>321</b>	<b>308</b>	<b>353</b>	<b>358</b>
<i>Memo: of which Outreach included in A above</i>								
Internationally Recruited Staff	5	4	8	10	9	11	12	14
Post doctoral, Associates, Visiting	1							
Nationally Recruited Staff	64	56	74	69	176	168	185	190
	<b>70</b>	<b>60</b>	<b>82</b>	<b>79</b>	<b>185</b>	<b>179</b>	<b>197</b>	<b>204</b>
<b>B. FINANCIAL INFORMATION (US\$ K)</b>								
<b>1. Revenue:</b>								
Unrestricted Core	2,762	4,277	5,762	5,628	6,773	6,990	7,800	7,690
Restricted Core	3,833	3,499	3,812	3,419	3,785	6,660	7,430	8,540
Other Income	205	141	361	343	309	200	250	300
	<b>6,800</b>	<b>7,917</b>	<b>9,935</b>	<b>9,390</b>	<b>10,867</b>	<b>13,850</b>	<b>15,480</b>	<b>16,530</b>
<b>2. Expenditures</b>								
Research, Conferences, Information Servi	6,298	5,628	6,491	6,081	6,869	10,500	11,540	12,560
General Administration and Operations	1,596	1,961	2,740	3,302	3,895	3,300	4,115	4,040
Subtotal	7,894	7,589	9,231	9,383	10,764	13,800	15,655	16,600
Indirect Cost Recovery	(1,006)	(434)	(493)	(447)	(334)	(457)	(650)	(550)
	<b>6,888</b>	<b>7,155</b>	<b>8,738</b>	<b>8,936</b>	<b>10,430</b>	<b>13,343</b>	<b>15,005</b>	<b>16,050</b>
<b>3. Excess of Revenue of Expenses</b>	<b>(88)</b>	<b>762</b>	<b>1,197</b>	<b>454</b>	<b>437</b>	<b>507</b>	<b>475</b>	<b>480</b>
<b>4. Capital Expenditures</b>								
Capital Acquisitions - center owned	62	476	497	143	230	400	200	200
Capital Acquisitions - in custody		201	323	1,545	912	379		
Depreciation	(92)	(89)	(244)	(266)	(240)	(290)	(300)	(300)
<b>5. Funds Balances ( Net Assets)</b>								
Capital Invested in Fixed Assets -Ctr. Owned	219	1,432	2,008	3,430	4,382	3,575	3,400	3,300
Capital Fund	492	188	765	888	846	805	1,100	1,200
Operating Fund	129	191	425	923	1,482	1,483	2,100	2,900
Net Assets	<b>840</b>	<b>1,811</b>	<b>3,198</b>	<b>5,241</b>	<b>6,710</b>	<b>5,863</b>	<b>6,600</b>	<b>7,400</b> #
<b>C. FINANCIAL INDICATORS</b>								
Current Ratio (Times)	1.21	1.07	1.25	1.25	1.26	1.42	1.83	2.10
Working Capital ( Days)	27	19	51	76	69	65	97	116
Operating Fund (Days)	7	10	18	38	52	41	51	66

During his visits to the Center, the Board Chair reviews the annual work plan, and progress made towards it, of the Director General. The Executive Committee evaluates her performance annually and reports on the evaluation to the full Board. Preceding the renewal of the Director General's contract, an even more comprehensive review of her performance was undertaken with a wide array of inputs. The process is clearly articulated and documented.

#### 4.1.3 Board Use of Center Commissioned External Reviews (CCERs)

The Board has made good use of available CCERs and other review mechanisms in systematically exercising oversight of the various components of the scientific program, a more challenging task than assessing the factual financial data and administrative structures and policies. Since a number of the nine programs have not had recent Board commissioned CCERs, **the Panel suggests that the Board, through the Program Committee, take a more active stance in the regular scheduling and commissioning of reviews.** The Panel recognizes that the Board has used CCERs to cover non-program areas, e.g., governance and structure and these are discussed in the relevant sections of this report. There may be benefit in having some Board participation in CCERs, either as an observer or a resource person to the CCER Panel. The intent would be to provide Program Committee members with a more intimate understanding of the Center's program and for the Center to benefit from the member's expertise. **The Panel suggests that, when feasible, the person leading the CCER be the person who presents the report to the Program Committee or Board, rather than a staff person, so that the CCER Panel's viewpoints can be discussed directly with the oversight body.** If the CCER is conducted immediately preceding the Board meeting this would represent minimal additional cost to the Center.

#### 4.1.4 Board Committees

Based on a reading of past documentation, and observation of one Program Committee meeting, it appears that the Committee provides careful and good oversight of the Center's programs. All members of the Board generally attend the Program Committee meetings, either as Committee members or as observers. It may be useful to formalize this and thereby eliminate the duplicative and time consuming reporting and minuting that presently takes place. **Accordingly, the Panel suggests that the Board make the Program Committee a committee-of-the-whole.**

The Nominating Committee has responsibility for evaluating Board performance, which it does through the administration of an extensive Board self-assessment instrument and the conduct of regular Board sessions to look at the internal strengths and weaknesses of the Board and the external threats and opportunities it faces. The Board assessment ratings which include each member's assessment of his/her own performance, an evaluation of the performance of the Board as a whole, and of the Board Chair, are consistently Good or Very Good. The Committee also monitors a thorough orientation process for new Board members. Excellent processes are in place for nominating new Board members.

The Audit Committee carries out its responsibilities thoroughly and assertively. Annually, the Audit Committee recommends to the Board the appointment of an appropriate External Auditor. ICLARM has a policy that mandates the audit firm be changed periodically. More current thinking is that the audit should be put out to bid every five to seven years in order to get competitive pricing and the opportunity for new insights, but this does not mean that the audit firm necessarily will be changed. A policy of reviewing the contract with the External Auditors every five to seven years, but with no requirement to change auditors at the time of the review, removes the possibility of "shopping" for a favorable opinion if a dispute arises with the current auditors, which is one objective of having a policy of changing auditors only at fixed intervals. By not requiring the auditors be changed, however, the inefficiency of changing external auditors is avoided if the Center and its Board are satisfied with the



performance and cost of the incumbent audit firm. **Hence, the Panel suggests that ICLARM eliminate its policy on the mandatory rotation of external auditors.**

The internal audit function is currently contracted out to an audit firm other than the External Auditors, since Management and the Board believe that the Center is too small to support a full-time internal auditor. An internal audit function is not only to ensure that policies are in place and being followed, but effective internal audit can suggest operational efficiencies and cost savings that should cover the cost of the function. The Audit Committee has asked Management to strengthen the non-financial audit aspects of the internal audit work. The Center's Audit Committee and Management have been reviewing closely the quality of the performance of the current internal audit work and are planning to engage a different firm because of their lack of satisfaction; the Panel believes that the Center's approach is appropriate.

#### **4.1.5 Continuous Improvement**

In 1996 the Board commissioned an evaluation of the governance of the Board of Trustees. Conducted by a consultant to the 1995 Mid-Term Review Panel of ICLARM and who had served as a resource person at ICLARM Board meetings for four meetings, the assessment was thorough and comprehensive and gave the Board a positive assessment. Given the high quality of the Board's performance, the Panel wishes to highlight only a few areas that the Board may wish to pay attention to in fine tuning its further development.

Because of the relatively small size of the Board, regular attendance at Board meetings is highly desirable. While, in the case of ex-officio members, substitutes may be sent, this is not a particularly satisfactory solution given that many of the issues being dealt with have a history and context that benefits from continuous service. Efforts to ensure maximum Board attendance need to be pursued, from rescheduling meetings when it is apparent that several Board members would be unable to attend, to getting commitment to dates even a year or two out or at the time of agreement to being nominated to the Board. The Panel recognizes that these latter suggestions may be more readily possible with members elected at-large.

As Centers look to ways to reduce the length of Board and Committee meetings, requiring the Chair to attend all meetings necessitates consecutive rather than simultaneous scheduling. This extends the meeting time required of all Board members. Additionally, there may be a perceived risk of dominance by one person. If there are advantages of continuity or adding an additional perspective in discussions, an alternative could be to share the load with the vice-chair of the Board. **The Panel suggests that the Board examine ways to reduce the overall length of Board meetings by the simultaneous scheduling of some committee meetings.**

From an examination of Board and Executive Committee documents, there does not appear to be a routine Board analysis at year-end of the Center's financial performance compared to budgeted performance. At most a comparison has sometimes been made with the previous year. Since March 1998, the Board has received quarterly financial statements which include a comparative statement of actual versus budget for the quarter. Comparing actual to budget for the year-end introduces a discipline and can yield lessons to be applied in the future. **The Panel suggests that the Board or Executive Committee routinely review an analysis of actual year-end financial performance compared to budgeted performance as part of its agenda.**

The Board may wish to consider "tasking" Board members to lead discussion on particular agenda items, rather than discussions being led primarily by the Chair, Committee Chairs, or Management in order to give more Board members an opportunity to develop and demonstrate leadership capabilities.

With the advent of fast, inexpensive communications international organizations today are becoming more "virtual" in their approach to geography. In order for a Center like ICLARM to benefit from having staff be where they will have the most impact, and at the same time feel just as much part of the organization regardless of location, attention to inclusion issues must be addressed. The Panel recognizes that the Director General has recently written a paper on communication issues with outreach sites. One approach that involves the Board would be to have one of the two Board meetings a year in out-reach locations on a rotating basis. The mutual benefits are obvious. Only those staff who need to attend that meeting would be there so the cost of bringing additional staff would not be significant. Such arrangements have proven rewarding at other CG Centers. **The Panel suggests that the Board hold one of its two Board meetings each year in an outreach site on a rotating basis whenever possible.**

Finally, the Board and Management have done an exceptional job of articulating policies, procedures, evaluation mechanisms, assessments and so on. The challenge will be to ensure that these continue to serve the Center and don't become mechanical and burdensome.

## 4.2 Leadership and Organizational Culture

### 4.2.1 Leadership

ICLARM benefits from strong leadership both at the Board and Executive Management Team level. From 1993 the successive Board Chairs and Director General have worked well together. From observing one Board meeting, its associated committee meetings, and reviewing documentation of the Board for the past five years, the actual, versus espoused, operating values of the Board could be described as conscientious, systematic, transparent, and committed to excellence and innovation both in science and management approaches. The Director General is viewed as open, seeking opportunities for interaction with all levels of staff, but with many demands on her time. The Panel appreciates how the Director General has strengthened the Center and gives her high marks for the leadership she has exhibited and the culture she has worked hard to create.

An Executive Management Team (comprised of the Director General, the DDG/Programs, the DDG/Africa and West Asia, the Director/International Relations and the Associate DG/Corporate Services) meets essentially weekly, with the DDG/Africa and West Asia tied in by telephone for parts of the meeting. The Executive Management Team has benefitted from explicit attention to team building and developing a shared view of its role and own operating values.

### 4.2.2 Improving Two-Way Communication

While the Executive Management Team would probably view itself as inclusive and consultative, it is important for the Panel to flag that there is a difference in perceptions between the Executive Management Team and senior staff. Many Program and Project Leaders seem to feel that interaction is a one-way street and that they are informed of significant decisions affecting them after the fact, with insufficient prior discussion. This issue was also highlighted in the CCER on *Program Structure*. These staff do not question the Executive Management Team or the Director General's responsibility to take final decisions. They are rather wanting a move to a more collaborative mode of consultation with feedback on the rationale that contributed to the final decision when possible. There

is a perception that the Research and Management Committee, set up in response to the CCER's recommendation, has become a forum primarily for discussing research proposals rather than for the original objective of consultation on issues facing the Center. However, the Panel has no doubt of the sincerity of management in wishing to bridge this gap.

Attempts are made routinely and frequently to keep staff at the headquarters and outreach sites informed of decisions, both by the Director General and the Board Chair, through the monthly staff newsletter *NewSplash*. While outreach sites appreciate the information received through the Newsletter, some continue to feel isolated, that their primary interactive contact with headquarters is requests for information, but that they receive back less information on the rationale for policy and budget decisions that affect them.

A Staff Attitude Survey (innovative for a CG Center) is conducted annually, which helps the Board and Management keep their fingers on the pulse of attitudes, perceptions and underlying values in the organization. The respondents are heavily headquarters staff, who now represent a minority proportion of the total organization. Overall, these respondents' concerns focus most heavily on the inadequate facilities and the need for staff development.

Accordingly, a definite challenge faced by the Center is its ability to make the transition from a predominantly centralized organization to one which can work effectively as a "virtual organization", where programs and staff can work seamlessly regardless of geographic locations. If the Center is to work effectively in this new environment, attention will need to be paid to understanding all staff needs (not just those at headquarters) and for effective communication and planning that is two-way and synergistic. The benefits of newer technologies such as email will only be maximized if they are supported by adequate and regular face-to-face interaction. This has obvious implications for travel budgets.

The ability of staff to see their work as part of a mosaic, contributing to and supporting the overall mission of the organization, is tempered by the demands of current fund raising and proposal writing requirements in the CGIAR system. Scientists particularly feel the newer demands on their time to take a share of the responsibility for generating successful proposals. This is a reality as it is not possible in today's climate to return to the old ways of primarily core funding. It is important for all staff to understand the role of staff costs and overhead in their total budgets, rather than viewing their budget as being the operating costs alone. Program and project leaders perceive their budgets as being set and cut arbitrarily; they need to have a clear understanding of how budget priorities are determined. A more collaborative, consultative process on these matters would benefit the Center and maintain morale. The expectation is that the revised planning and budgeting process, to be implemented fully in 1999, will make the process more transparent to staff.

#### **4.3 Managing the Programs and Their Linkages**

##### **4.3.1 Structure**

Currently ICLARM has nine programs executed through 13 funded projects, staffed by a total of 23 IRS (excluding IRS executive management). There are six outreach sites for research. With the addition of the Abbassa site, the proportion of outposted staff has shifted from 36% in 1994 to 58% in 1998 (Table 4.1). These proportions are projected to remain constant through to 2001. Two-thirds of the IRS and all Program Leaders, except for the Coastal Aquaculture Center Program (CASEP), are located at Headquarters. The Center recognizes that greater synergies are possible in managing the programs and their linkages and is actively working to achieve these within the Center's budget

constraints. A matrix of linkages between programs was provided in Table 2.5. Program linkages are fostered through the scientific review process (see next section) and regularly scheduled Research Committee meetings.

#### **4.3.2 Linking Plans, Budgets and Implementation**

Research projects are formulated at the research level taking into account the Medium Term Plan 1999-2001, which was developed as a result of a consultative process, and now also the evolving Strategic Plan. At present the Center does not use the Logical Framework Analysis for determining linkages between desired outputs and objectives but plans to do so next year. There appear to be excellent linkages between the Programs and the NARS. Projects are developed in a step-wise process beginning with concept notes and feedback e-mailed throughout the Center and then discussed by the Research and Management Committee (further discussed in Section 4.6). The Center is well aware of the potential weakness it has in needing to be responsive to donor priorities and is continually balancing to ensure that projects are within its Medium Term Plan.

In 1997 the Center instituted an internal scientific review of programs, attended by all Program Leaders and key project leaders from the outreach sites. This was not held in 1998, instead Program Leaders were brought together to work on the new Strategic Plan, but will be held again in 1999. A budget planning process, spelled out in considerable detail, was developed during 1998 but only part of the process as planned was actually completed because of timing constraints. The plan is to be fully implemented in 1999 for the budget year 2000. The intention is to give enough time for consultation with program leaders and project leaders, and across programs, a process which has been inadequate until now. It will be critically important for program and project leaders to feel "heard" and not simply listened to at that meeting. An additional benefit of such a process and meeting will be, in the future, the opportunity to look back at year end, and review the actual spending pattern and the associated achievements compared to plan. The Panel endorses the steps taken so far.

With respect to scientific content and program linkages, the planning processes seem to be adequate. The Panel believes there is adequate cross-fertilization between programs, and that program and project leaders evidence respect and collaboration for their colleagues across programs. With regard to linkages between programs and outreach sites, there is no lack of will but rather a lack of funds and time.

At an operational/administrative level, the Center has been steadily working to improve its program management and to leverage linkages across programs and between programs and outreach sites. While the work is not yet complete, the infrastructure is being set up. Maximum use of Program Assistants to lessen the administrative burden of project management on scientists is urged; this is discussed further in section 4.4.1. Management has prepared a paper on plans for effective communication between the headquarters and outreach sites.

#### **4.3.3 Strengthening Research Management**

In early 1998 the manual *Guidelines for the Planning, Implementation and Evaluation of Programs and Projects* was issued. The manual defines the decision-making processes, establishes the responsibilities and authorities for decision-making, and provides the framework for the development of a project management information system. A new financial system, scheduled to be fully operational in 1999, should assist program and project leaders in monitoring project funds.

#### 4.4 Corporate Services

The Corporate Services Division, headed by an Associate Director General, manages the Board of Trustees secretariat, human resources, finance and management information, administrative services and liaison, information technology, planning and budgeting, and financial and administrative systems. There is a total of 41 staff in the Division; 1 IRS, 7 NRS Managers/Assistant Managers and 33 support staff. During the period under review, the annual revenues of the Center grew from US\$6.88 million (1994) to US\$10.9 million (under audit, 1998) (Table 4.1). A detailed description and analysis of the Division's activities and plans were made available to the Panel. A new Associate Director General, with a strong background in finance and extensive experience in the CG System, was appointed in January 1998. Under his direction the Division is being reorganized and revitalized; a strong service-oriented culture with a flattened organizational structure is being created.

The most recent CCER of the Corporate Services Division was conducted in 1996. The review was thorough; all of the review recommendations and suggestions were implemented. In 1998, vision, strategy and operating values were articulated with Division staff-wide involvement. However, since the time of the CCER, major organization changes have been put in motion, with the results still to be fully achieved.

Significant cost savings are budgeted as a result of the reorganization. Credit must be given to the procedures and processes that have been put in place by the Associate Director General for Corporate Services and his managers. More attention to all Corporate Services Division functions at outreach sites is planned for 1999, when new Center-wide systems are fully in place. **The Panel suggests that, in view of all the changes underway, it will be useful for the Corporate Services Division to survey staff, both at headquarters and outreach locations, about the user-responsiveness and friendliness of the services, when the systems are fully implemented.**

##### 4.4.1 Financial Management

The financial management of ICLARM's resources is the responsibility of the Finance and Management Information Unit. The unit performs its functions in accordance with the financial policies established by the Center, which are in conformity with CGIAR accounting and financial reporting policies as well as conforming to generally accepted accounting principles. Ten NRS staff the unit. Quarterly financial reports are now made to the Board of Trustees and comprehensive reporting is presented at each of the Board meetings. Monthly comparative financial reporting is provided to Management, Programs and Units. An extensive *Accounting and Finance Unit: Policies and Procedures Manual* (1993) and a *Financial Information Manual* (1996) are in place although sections of them need to be updated.

Platinum for Windows is presently being installed successfully as an integrated financial system. Phase I, consisting of the General Ledger, Bank Book and Report Writers was fully operational in September 1998. The new system is Year 2000 compliant. The system is being thoroughly documented. Financial transaction data from outreach sites will be recorded using QuickBooks (the Abbassa site is already using this) and will be interfaced with the system. The staff in the Solomon Islands need a software package that will handle foreign currency transactions since they are working in Australian, Canadian, and Solomon Island dollars, and have to report to headquarters in U.S. dollars.

The Center uses Program and Budget Assistants from the Planning and Budget Unit to assist in the preparation and management of the Center's budget and to interface between project leaders and the financial and administrative functions, thereby relieving the administrative load of project leaders at

headquarters and outreach sites. Further attention may need to be paid to how these Program Assistants can remove still more of the administrative burden from Project Leaders. It is not cost-effective to have Program Leaders spending too much of their time on project management activities that could be handled by less highly paid people. As the Center moves forward on the new Corporate Services Division structure and Platinum, it will be crucial for these program and budget assistants to be well-versed in their areas of responsibility, and proactive in carrying out their duties.

The treasury function is the custodian of the Center's funds. Like many other CG Centers, ICLARM has a conservative investment policy, adopted in 1994, whereby cash surpluses will be deposited only in interest-bearing fixed-term deposits with its house banks; it will not be involved in any other investments of a commercial nature. The investment policies are currently under review by Management for Board consideration.

The external audit function has been handled by Joaquin Cunan & Co. (Price Waterhouse) since 1994. A partner of the firm meets with the Audit Committee both in the presence of Center staff and then privately at the time the annual audited financial statements are presented. With the exception of 1994, when the Center's capital assets held "in trust" were expensed rather than capitalized, the audited statements have been prepared in conformity with generally accepted accounting principles and the accounting and financial practices prescribed in the CGIAR guidelines. The audit firm issues a management letter to accompany the financial statements. No significant issues have been brought to the attention of the Audit Committee in the management letter that have not been addressed by the Center. No external audit is currently done in Egypt or the Solomon Islands. Given the size of these operations (annual budgets of \$1.2 million and \$0.8 million, respectively), the Panel endorses the Center's plans to begin conducting audits on a regular basis beginning with the audit for the 1999 financial year.

The internal audit function is contracted out to a different audit firm, Punongbayan & Araullo. This approach is not fully satisfactory yet and is being monitored carefully both by the Audit Committee and Management as discussed earlier.

#### **4.4.2 Human Resources**

##### **4.4.2.1 Human Resource Management**

The Center has sound human resources policies and practices, which are generally consistent for both headquarters and outreach sites. Current personnel manuals for IRS and for NRS at each location, a *Position and Salary Structure* program and tables, and a *Staff Performance Management Program* covering both IRS and NRS and which includes performance appraisal processes and developmental plans for staff, set the framework for a human resource management system which is implemented by supervisors for staff directly under their direction. Salary increases are in accordance with the *Position and Salary Structure*. A small (3 NRS) Human Resources Unit functions in primarily an administrative role, following established procedures. The work of the Unit is supplemented by the Financial and Administrative Systems Unit and the Program and Budget Assistants who interface between program and project leaders, both at headquarters and outreach sites.

The Unit is "tasked with maintaining the staff development system of the Center and for including the costs of such staff development in the annual budget of the Center", and activity for which there is much demand by staff as evidenced by the Staff Attitude Survey and the EPMR Survey. There appears to be no in-house capacity nor a sense of how to develop this capacity in the Human Resources Unit. This is not to imply that the actual staff development training or activities would be conducted by HRU, but that HRU would take responsibility for organizing in-house activities. Although budgets are

constrained, it is possible to creatively attend to training needs, such as borrowing relevant videos that come with discussion guides, stimulating journal discussion groups, or having a staff member with a particular expertise conduct a training session or "brown bag" lunch, as just some examples. The Panel believes the Center must pay attention to staff development needs to keep staff motivated and current.

The Panel notes that as ICLARM transitions to a new headquarters site the current Human Resources Unit does not have the expertise (both knowledge and experience) needed to guide the many personnel considerations that will arise. The Center recognizes this, and planning is underway to supplement existing capabilities.

Along with ICLARM's growth, the number of people employed has also increased, from a total of 195 (21 IRS) in 1994 to 321 (28 IRS) in 1998. Of these, there are 19 IRS, 2 post-doctoral and 115 NRS at headquarters and 9 IRS and 176 NRS at outreach sites (Table 4.1). Much of the staff growth has come from the addition of 93 people at the Abbassa site. From the outreach sites' perspective there is little interaction with the HRU, except for requests for statistics. Outreach sites handle their own human resource administration matters.

The workforce is comparatively stable with below average turnover of 13% during the past four years at both the IRS and NRS levels. Of the IRS at ICLARM 5 years ago, 60% are still there; 48% of current IRS were at ICLARM five years ago. There will be turnover in key scientific staff in 1999.

#### 4.4.2.2 Gender Analysis

While only 11% of the 28 IRS positions are filled by women, at NRS management, scientific and supervisory levels women represent 47% of the staff. One associate expert at headquarters is also a female (See Appendix V for more detail). The Center is noteworthy in having the only female Director General in the System. Women are also well represented at both supervisory and non-supervisory levels at all outreach sites except for Egypt. The Center needs to pay attention to seeking out qualified female candidates for IRS positions. **The Panel suggests that the Board monitor gender statistics through the regular reporting of data as suggested in the CG document *The Role of Boards in Addressing Gender Staff Issues*.**

#### 4.4.2.3 Time Limits on IRS Employment

In 1993 the Board, like some other CG Centers at that time, adopted a "ten-year rule" for IRS in order "to provide a flow of new skills, knowledge and abilities to ICLARM". While exceptions up to a total of 15 years are possible, nevertheless, a simplistic rule instead of hard individual management decisions based on performance and international accomplishments seems fainthearted. Like the CCER on ICLARM's *Program Structure*, the Panel believes that the use of such a blunt instrument, particularly in the field of fisheries, detracts from the ability to recruit and retain top-class scientists and is accordingly detrimental to ICLARM's producing the best science. Most scientists in the age band ICLARM is trying to attract would automatically be put back into the job market at an age where university positions are harder to come by. There is much less mobility in the field of fisheries than in agriculture. The Panel agrees with the CCER that there is little justification for enforcing the departure of a scientist in the forefront of his or her field, who adds luster to the Center, and who may be unlikely to be replaced by someone of similar caliber. The very desirable objective of the rule needs to be balanced against the need to maintain quality programs as well. Where staff do not perform, or where their interests no longer fit with the changed requirements of the Center, these are better managed through performance appraisals, candid discussions and non renewal of contracts. The present rule has

created significant morale problems and frustration among the research staff. For all these reasons, the Panel feels very strongly that the ten-year rule is not productive. As a result:

**The Panel recommends that the Board develop an alternative policy to the ten-year limit on staff tenure taking into account the particular needs of the Center.**

#### 4.4.2.4 Policies and Their Assessment

Many personnel policies and procedures manuals along with accompanying *Implementing Guidelines* are in place. These are generally clear, consistent, and current. Personnel policy manuals exist for IRS and separate ones for NRS at Bangladesh, Egypt, the Philippines and the Solomon Islands (this latter one is in the process of being finalized) taking into account local culture and customs. The Panel believes it would be useful for Implementing Guideline 001: *Staff Performance Management Program* be made a part of each manual since performance appraisal processes need to be clear and readily available to all staff. The IRS and NRS policies treat the definition of spouses differently, with the IRS policy including "non-married partners". While this may be a reasonable distinction for NRS in most circumstances, staff in the Solomon Islands point out that local laws recognize de facto relationships and traditional marriage forms which incorporate "recognized binding couples". In developing the Solomon Islands policy, this local practice could reasonably be recognized, just as NRS staff in Egypt work a 35-hour work (closer to local practice) instead of the 40 hour work week required of NRS in other locations.

The revised 1997 Staff Performance Management Program has been implemented for all IRS and for headquarters NRS. A similar system is in place for outreach sites. When applied well, this can be a significant tool in planning, monitoring, evaluating and planning staff development at the individual level. A comprehensive, documented, and well-developed *Position and Salary Structure* was adopted in 1998 and developed in consultation with recognized outside compensation specialists. IRS salaries are competitive with those of other CGIAR Centers. Salaries for NRS at headquarters are monitored regularly for competitiveness with the local market and adjustments made for staff in the Philippines but this is not done as regularly for outreach locations. At present there appears to be a lack of competitiveness in salaries for some categories of NRS in the Solomon Islands; grounds staff at Gizo are paid less than their counterparts in government service, who, unlike ICLARM ground staff, also receive a house (instead of a partial housing allowance) as a normal part of their compensation package. **The Panel suggests that Management institute routine processes for ensuring that ICLARM's compensation is locally competitive for NRS at outreach locations as well as at headquarters.** This is an agenda item for the upcoming Board meeting.

Working among many different cultures and nationalities, clarity in expectations can avoid misunderstandings. ICLARM is unique in having explicit *Codes of Conduct* for all levels of the Center.

#### 4.4.2.5 Nationally Recruited Staff Advisory Committee

A Nationally Recruited Staff Advisory Committee is in place at headquarters only and met with a Panel member. The only issue raised was concern about salaries in the light of devaluation of the Peso, an issue which was being attended to by Management. The Committee's purposes are to advise the Director General on work matters of interest to and concern by the Philippine-based NRS, to raise issues, initiate discussions and develop options for action to address these matters, and to act as a conduit for 2-way communication within HQ e.g. by providing feedback to the staff executive. Comprised of 17 members, nine of whom are representatives of their units and the remainder are ex-officio or appointed by the Director General, the Committee is chaired by the Director General. This arrangement provides the Director General with a clear line of two-way communication. A lost opportunity could be that with



so many members appointed by the Director General and with the Director General chairing the Committee, dissident voices are less likely to be heard. In addition, since many staff are located outside headquarters, the Center may wish to consider establishing staff advisory committees at other large outreach sites.

#### **4.4.2.6 Staff Attitude Survey**

Overall, staff feel that ICLARM is a good employer and appreciate the opportunity to work in an international center and with respected colleagues. The Center is progressive in conducting an annual *Staff Attitude Survey* whose purpose is to measure how each staff person views various aspects of their work. Questions are asked about attitudes toward ICLARM, communications, organization structure, the individual's job, workload and recognition, leadership, group effectiveness, career satisfaction and work relationships. The response rate is much higher for headquarters staff than for outreach people. The Center scores well on most dimensions. In 1998 the areas of greatest dissatisfaction were working conditions and their impact on the quantity and quality of work produced, and the lack of training and development opportunities available.

Because such a low response rate has been obtained from outreach sites the EPMPR issued its own brief survey. Of the 147 responses received, 35% were from headquarters and 65% from outreach sites. A little over one half of IRS responded, equally distributed between headquarters and outreach sites. The responses have been used in shaping views throughout the report, but two that particularly stand out are the desire for staff development and training in all locations (in Egypt, particularly English training), and the need for better interaction between scientists and the Executive Management Team in planning, priority setting and budgeting.

#### **4.4.3 Administration and Facilities**

Previous reviews (both the Mid-Term Review and the 1994 and 1996 ICERs on Corporate Services) found the Administration Unit under-supported in staffing, facilities and equipment. The Corporate Services Division reorganization has addressed these issues. Fifteen NRS staff the function, including one Manager. A new liaison function has been created to work with Government offices to speed up ICLARM's operational needs. A host country agreement was finalized in 1995. At the same time, some activities, mainly budgeting, which were a part of Administrative Services have been moved elsewhere. Janitorial services, security, travel office, some mailings and photocopying (except for salaries) have been outsourced. The new structure has logic and cohesion.

A June 1997 review of purchasing, transportation and grant contract management was carried by Price Waterhouse. No serious shortfalls were noted and the various recommendations made as a result of the audit have been carried out by the Center.

The headquarters facilities are quite inadequate, as discussed further in Section 4.7. The Abbassa facility is well on the way to being fully renovated in an excellent manner. The Solomon Islands, through collaboration with the OFCF (Japan) has obtained access to additional scientific equipment and facilities. The field site at Gizo, like the outreach site in Malawi, could benefit significantly from very modest investments in infrastructure.

#### **4.4.4 Information Technology**

The Computer Services Unit operates and manages the central computers and the network infrastructure (including IVDN, email and the ICLARM internet homepages) at Headquarters. The Unit provides desktop support, technical assistance and advice, and oversees database and application

developments. At present limited assistance is provided to outreach sites, but plans are to integrate better outreach and headquarters support in the near future, once major IT projects at headquarters are completed this year. The Unit is competently staffed by 1 NRS manager and 4 support staff. An excellent "Computer Services Guidelines" document was published in 1998.

Because of the temporary and substandard physical environment in which the headquarters staff operate, much of the network cabling throughout the building is quite temporary and some technological decisions are on hold.

#### **4.5 Financial Status of the Center**

The Center's financial status has improved steadily since the 1992 and 1995 reviews (Table 4.1). Annual revenues have increased by 65%, from \$6.6 million in 1994 to \$10.867 (pre-audit) million in 1998. The current ratio (a measure of the Center's ability to meet its financial obligations and calculated by dividing the current assets by the current liabilities) has remained about constant with the exception of 1995 when it deteriorated slightly. As of the end of 1998 the Center had \$1.26 in current assets for each \$1 it had in current liabilities. During the same period the total fund balances (net assets) have grown from \$0.84 million to \$6.710 million (pre-audit figure for 1998); the operating fund increased from \$0.129 million to \$1.482 million (pre-audit). The number of operating fund days grew to 52 from 7 days in 1994; the CGIAR requirement of 90 days is a continuing goal for the Center. Certainly the Center's financial condition has improved markedly during the review period.

While the Center has improved its fund balances and reserves, cash flow management remains a major challenge for ICLARM. The Center experiences cash flow shortfalls between January and June each year because the Center's work goes on, but a number of donors do not disburse funds until the second half of the year. Problems of particularly late remittances by a few donors continue to be severe in some cases. In January 1999 one major core donor still had not remitted the second half of the 1997 core contribution nor any of the 1998 contribution, a figure amounting to \$1.36 million. The 1997 payment was subsequently received in February 1999. Some other 1998 contributions are still outstanding. The obvious stress this places on the Center's finances is compounded by the loss of interest to the Center. The Panel notes that this is a System-wide problem, not one faced only by ICLARM. In 1997 and 1998 the strengthening of the U.S. dollar against all other currencies also caused important budget losses for ICLARM.

Another area where the Center's finances are impacted by donor practices is the Center's ability to recover fully the indirect or overhead costs associated with restricted grants. Donors impose ceilings on overhead recovery rates which are well below the actual rates incurred. This too is a System-wide issue. Despite the establishment of an overhead recovery policy and continuing efforts by the Center, ICLARM continues to recover only a small portion of the actual indirect costs incurred. The most recent figures show ICLARM incurs an indirect cost rate of 34.4% for projects undertaken on-site and 29.7% for field activities. The 1998 actual rate has further declined from past years to 9%. This means that unrestricted funds must be used to subsidize the cost of restricted grants. The Panel is satisfied that the Center is taking a number of useful approaches and is pursuing this issue appropriately.

The Center is paying close attention to its liquidity position and has taken useful steps to ensure that cash flow is maintained. The Panel cannot underscore too heavily to the Donors the urgency of remitting contributions in a timely way.

#### 4.6 Resource Mobilization

An External Relations Office was created in 1995 to work with both research and donor staff to ensure that use is made of funding sources that might not otherwise be tapped, and that project ideas are well-presented according to individual donor requirements. A half-time IRS Director was appointed initially but for personal reasons was unable to continue. The Office now consists of one locally recruited External Relations Coordinator, reporting to the Director General. The primary responsibilities of the position are to coordinate the Center's project development and resource mobilization efforts, to compile a database of donors and their requirements, to codify procedures for donor relations, to assist scientists in writing proposals and to keep track of those submitted to donors. The Center has \$3.9 million in projects expiring in 1999 and \$4.4 million in pipeline projects which the Center anticipates materializing in 1999.

A CCER on ICLARM's *Program Structure and the Offices of International and External Relations* was conducted in 1997. The review argued for a position that would have the seniority or experience to engage in medium- and senior- level contacts and lobbying with donor programs. The review made two recommendations. The first was that ICLARM draw up a strategy for fund-raising involving the raising of public awareness in donor countries, the development in-house of new concepts and proposals, the mobilization of NGOs, and the initiation of contacts with new potential sources of funds. In response, through a participatory process involving Headquarters managers and research staff, the Center developed a detailed *Resource Mobilization Strategy* and implementation plan which was adopted in 1998. The strategy "seeks to increase and sustain donor support by developing and implementing larger projects of an integrated multidisciplinary nature".

Since the strategy was developed, new processes have been put in place for the development of proposals from a Concept Note stage forward and these proposals have wider input from research staff throughout the entire Center and in the case of large proposals, from reviewers outside the Center. As a result, the Center believes that proposals are improving in quality and creativity.

The second of the CCER's recommendations was that the functions of the External Relations Office (essentially the position of External Relations Coordinator) be maintained, but absorbed into a Project Development Office or Donor Relations Office and as soon as feasible a Unit Head be appointed with the main task of seeking funds from sources which have not yet been tapped by ICLARM. The Center has not acted on this recommendation, believing that the Center's resources cannot justify the employment of an IRS for this purpose. Instead, through the development of the resource mobilization strategy, the Center's approach is one of shared responsibility for obtaining funds, and with individual responsibilities clearly outlined. The role of the Director General and other senior research staff in fund raising is critical to create and maintain contacts at the highest levels, particularly given the strategy of seeking larger projects of an integrated multi-disciplinary approach. At present, the Center's track record of growth tends to support the Center's current approach.

The Panel understands the Center's rationale yet urges the Center to be vigilant and monitor the situation carefully in the event that the strategy does not yield the desired results, especially in light of the projected increase in total funding from \$10.867 million in 1998 to \$16.530 million in the 2001 Medium Term Plan. The Panel feels that a more senior level position, dedicated to fund raising, can pay for itself many times over, but recognizes that given the nature of the position, it would be difficult to fund as the person would have to be paid from unrestricted funds. If the Center moves to a research structure of fewer programs, as is being discussed by the Center, this may down the road release time for the DDG/Programs to become more involved in donor relations.

#### 4.7 Relocation of Headquarters

The Center's headquarters facilities are inadequate for operations and there are no research facilities; the space is spread over four floors in substandard, crowded, expensive rented space in the business district, Makati City. The inappropriateness of the space has resulted in a corresponding lack of commitment to make major investments in cabling and other capital investments. The lack of a permanent headquarters, has resulted in staff uncertainty about their futures. The current inadequate facilities are listed on the staff surveys as having a negative affect on both quality and quantity of work.

The 1992 EPMR noted ICLARM's need for land to establish its headquarters and research facilities. Seven years later, despite many seemingly promising starts, ICLARM is still without an adequate headquarters and research facilities in the Philippines, despite paying annual rental of almost one half million U.S. dollars. In addition to operating in inadequate facilities, the lack of a permanent headquarters site has resulted, quite reasonably, in an unwillingness to provide needed capital investments such as security, PABX, telephone lines and systems for increased computer capacities, and IVDN. The Board and Management are taking a two track approach, continuing to look for a site in the Philippines that meets the specified requirements and at the same time seeking a suitable site that meets pre-established criteria in other countries in the region. In the event that a site outside of the Philippines is chosen, some elements of the program will be maintained in the Philippines. The Board has adopted relevant and objective criteria to be used for the site selection. Detailed plans have been developed for the transition regarding impacts on costs, staff, operations, and the research program of the institution, under each scenario. The Panel commends the thorough approach the Board and Management are taking and stresses the urgency with which these matters must be resolved.

The Panel understands that the Board of Trustees will be considering two options for a headquarters site (Subic Bay in the Philippines and Penang in Malaysia) at its February 1999 meeting. The Panel has reviewed the documents and minutes of Board and Executive Committee discussions; it believes that the Board and Center are following a well thought out process. The Panel feels it would be inappropriate for the Panel itself to make any comment on the choice of the headquarters site.

**The Panel recommends that the ICLARM Board and Management place the highest priority on locating and transitioning to a permanent headquarters site that meets ICLARM's criteria.**

## CHAPTER 5 - ICLARM INTO THE 21<sup>ST</sup> CENTURY

Living aquatic resources (LARs) are facing crises because of poor management, increased pollution and other forms of environmental degradation. As a result, stocks are declining in both inland and marine environments. Fish are among the most endangered groups in global biodiversity. At the same time, demand for fish for human consumption is increasing rapidly. All is not bad, however. There are significant known opportunities to reduce the threats to LARs and increase their contributions to human welfare, e.g., through aquaculture expansion, fish health improvements, policy changes, and management innovations. In many cases small amounts of strategic and applied research can move these possibilities off the shelf of ideas and into the mainstream of practice and implementation. Fisheries research is in its infancy; and the potentials for gain are tremendous, as has been shown by ICLARM in the past with its work on genetically improved farm tilapia (GIFT strain fish), co-management of community fisheries, giant clam and coral reef management, and many other innovations.

ICLARM and its partners have been in the forefront in identifying the issues and in showing how to take advantage of the potentials. Section 2.3 has highlighted many of these past achievements and positive impacts of ICLARM. Here we want to focus on the future - on what the Panel thinks that ICLARM, with adequate support, can do to help the global community counter the threats and take advantage of the opportunities.

### **The Justification for more LARM Research**

Major portions of the world's population of poor (as many as one billion people) depend on aquatic products for the main part of their animal protein. Yet projected requirements are considerably beyond projected supplies of aquatic products for human consumption. Many millions of people depend on fish and fishing as their source of income; and the numbers are growing. Aquaculture production of the world alone now contributes around \$47 billion per year (including aquatic plants). These numbers will increase further as other sources of protein stabilize or become more scarce. Other statistics on the immensity of the dependence on aquatic resources were cited in Chapter 1. The basic point is clear: This is a major and important sector in meeting humankind's need for food and other products.

Yet, at the same time, it also is clear that research related to LARM is at a very early stage in terms of application of the tools of modern science; and there is every evidence that expanded research in this area could have significant payoffs in terms of the goals of the CGIAR. It is the Panel's view that resources devoted to research on LARs and their management does not match the importance of the sector and its *potential* for future contributions. Past research shows the promise that lies ahead if LARM research gets the necessary boost to bring it up to its potential. Thus, while capture fisheries have reached a plateau of production (around 90 to 100 million tons) and are mainly in need of sound management to avoid future declines, the technical potentials for aquaculture expansion have hardly been tapped.

The aquaculture sector is the fastest growing major food production sector, increasing at an estimated annual rate of about nine percent. And most important from the CGIAR's perspective, aquaculture production is particularly important in the low-income food deficit countries (LIFDCs). The species base potential for aquaculture is enormous. Relatively few species are being used for culture. Increased aquatic food production can benefit from further research on candidate species representing different trophic levels. The potentials for gain are widespread.

The range of potential gains from research can be illustrated with a few examples of ICLARM's research results in modelling and database development, genetic improvement of fish, development of management innovations for poor rural farmers, and identification of policy options for improving community management of local fisheries (See box 5.1).

**Box 5.1. Examples of Research Benefits From ICLARM**

The development of the software tools for the assessment of tropical fisheries (FiSAT) and ecosystem interactions (Ecopath with Ecosim) provide insights into mass balances and energy flows between various components in aquatic ecosystems. Using these softwares, managers can simulate and predict possible changes that may result from changing fishing efforts, climate and other changes. Databases (FishBase and ReefBase) with tremendous amount of information have provided additional linkages for enhanced resource and ecosystem assessments. They are powerful aids for the identification of management needs and directions for fisheries research. These tools and databases have been widely adopted and are increasingly being used for fisheries management in many countries (Table 2.3.3a). FiSAT is currently the only tool available for tropical fish stock assessments.

ICLARM's focus on poverty is discerned through its aquaculture programs. Perhaps the best known outcome of ICLARM's research in this area is the GIFT tilapia. Over 7 generations of genetic selection have enhanced growth by 85%. Its impacts have been assessed in five countries (Bangladesh, China, Thailand, Philippines and Vietnam). Improvements in on farm growth rates relative to local strains have varied between 18% in China and 66% in Bangladesh. Because of their fast growth rates, GIFT fish consume less food. In Bangladesh, for example, feed requirement this has decreased by 30%. The GIFT fish is now widely farmed in Asia.

Thus far, ICLARM's work on integrated agriculture aquaculture systems has been limited to Malawi and Bangladesh, and within these countries, research has been conducted on localized scales. ICLARM has demonstrated significant impacts at this scale of operation in terms of increases in fish production, overall farm output, and increase in household incomes (Table 2.3.3b). Other significant outcomes include enhanced nutrition and natural resource (including water) conservation. The approaches in Malawi and Bangladesh touch at the heart of rural economic development, and clearly signify the way forward in as far as rural development is concerned. Given that 80% of the population in developing countries live in rural areas, there is justification in increasing resource allocation in this area. ICLARM is now beginning to apply similar approaches to Vietnam. There is huge potential for wider scale application in other regions.

Approaches to fisheries management, which are based on massive state appropriations of natural resources, centralized administration, policing, and heavy demands on financial resources, have proven to be generally ineffective and increasingly obsolete. Current management initiatives, such as co-management and user-based fisheries management which are development-oriented, people-centered and based on traditional approaches, promise to be more effective for sustainably managing fisheries. Through its global research on fisheries co-management, ICLARM is playing a leading role in analyzing, documenting and disseminating best practices based on these traditional approaches. The research product will be the development of unifying principles for wider scale application.

## **ICLARM and International Research**

ICLARM, as a global center, has particular advantages in LARM research because of the international and often global nature of LARs and the issues and potentials that face them. The benefits from international activity in LARM research accrue because: (1) the problems and potentials involved in LARM know few national boundaries; and with limited resources available, it is critical that the significant international spillovers are fully realized; (2) even for those systems that are not international in nature, the impacts of international pollution can be significant; (3) such research is needed to provide a consistent basis for international and national policies to control the negative, and encourage the positive, spillovers across national boundaries. International research can help identify the needs and options; and (4) it can help (as ICLARM has) to support international processes, such as through the Convention on Biological Diversity.

ICLARM has positioned itself well to productively and proactively work with its partners in addressing key issues and opportunities that have international dimensions. The Panel has stressed the need to focus on those themes which can produce international public goods, since these are where a center such as ICLARM has its true comparative strengths. By leveraging its resources with its various partners, it can achieve results that go far beyond the direct outputs from its own research. ICLARM has always had a special role in developing and putting in place early warning systems for pending problems - an ability that will be increasingly important as coastal populations grow and the threats of large-scale misuse of resources increase.

There are considerable pressures on the CGIAR system to become more interactive so that it can approach resource use and environmental conservation more holistically. As the only center dealing with LARs related problems, ICLARM serves as a major resource to the global CGIAR system.

## **ICLARM Into the Future**

The Panel has in several places commended ICLARM for its progress. It has come a long way over the past few years, as indicated in chapter 1. It has become a well-recognized, world-class institution with widespread involvement and influence in the LARM world. It has established both a cohesive set of projects addressing priority issues; and it has developed a strong and effective management system and approach. Its linkages with partners have grown to the point where it has many strategic alliances that permit it to work effectively in its mandate regions. ICLARM now is ready to move into the twenty first century with new and expanded approaches to addressing the key issues and opportunities.

ICLARM's current draft strategic plan illustrates that, as the center moves into the next century, it is preparing to take advantage of new opportunities in science and new challenges in LARM, particularly in its priority mandate regions of Asia and Africa and West Asia. At the same time, it continues to pursue its contributions in its traditional areas of activity and expertise. Taking on the new, without abandoning the old, creates a unique set of challenges for ICLARM. These challenges relate to clashes of research cultures, sensitivities that surface in developing multidisciplinary research approaches, and reconciling proprietary feelings towards old techniques and approaches with the promise of rapidly advancing, oftentimes quite revolutionary new approaches to modern science. In addition, there is the formidable challenge of raising outside awareness of the potentials and then adequate resources to meet them. The Panel believes that ICLARM is well aware of the challenges and is preparing to meet them head on as it moves into a new phase of its existence, with a new headquarters and a major regional program in Africa.

### **Integrating and Consolidating ICLARM's Research Thrusts**

ICLARM has an array of programs that can address the various issues on key fronts. It has recognized and demonstrated clearly that adoption of innovations depends on creation of the incentives that come from introduction of resource-saving and productivity-enhancing technologies and that, in turn, development of appropriate technologies depends on understanding the needs on the ground and adoption processes at work, including the institutional constraints that must be overcome.

ICLARM has sought a balance in its research and development oriented activities. It needs to continue watching that balance as it moves into the future, where pressures to focus on the development side of the equation are likely to be stronger rather than weaker. It needs to balance its progress in biotechnology work with its activities in database development and management, integrated aquaculture-agriculture development, and training and networking.

Many new management and technology exist in LARM that could make significant differences in poor people's lives, if only the institutional and economic conditions were in place. ICLARM recognizes that needs for the future include social science research fully as much as technology research. Basic biological research is needed in ICLARM to keep the center "ahead of the curve" as existing technologies move into the mainstream of practice. The lag time can be significant. The balance between technological and social science research is a critical one to maintain. Fortunately, ICLARM is well aware of the critical nature of this balance. Its program direction reflects this sensitivity to the need to have social science capacity that can focus on dissemination and adoption created by its more technologically oriented research.

The Panel also notes the expanding understanding of the interactions within ecosystems having living aquatic resources. This new knowledge is providing insights on the need for more integrated approaches to the management and utilization of such resource systems. ICLARM is in the forefront in pointing the way for a systems approach to LARM research, one that builds on the complementarities that exist, but also recognizes the potentials for conflicts and the need to manage resource systems holistically to avoid the potential damage to LARs that can be generated from outside the sector. Its current work linking logging to coastal resource damage is a clear example of this integrated approach that ICLARM wishes to pursue in the future. Similarly, the integration of various themes in ICLARM's co-management research illustrates the potentials. The benefits from such integrated resource systems research are just beginning to be understood in management circles. The logical extension of this argument is that ICLARM should move ahead aggressively to search out opportunities to work with natural resources management focused centers in the CGIAR. Likely prospects for collaborative activity include ICRAF, CIFOR, ILRI and IWMI. As indicated earlier, other centers in the System, such as IITA and WARDA also are being considered for collaborative relationships by ICLARM and ICLARM has collaboration with IRRI.

There currently are good linkages between programs in ICLARM. However, as ICLARM recognizes, through further consolidation of the current programs it is possible to encourage even stronger and more effective multidisciplinary, larger scale and longer running projects that take full advantage of the potential complementarities between biological and social science inputs, between strategic and adaptive research, and between synthesis work at headquarters and the site focused work in the field.



### **Focusing on Common Goals and Priorities**

All of ICLARM's functions and activities need to move towards the same set of transparent goals in a cohesive and coordinated fashion. Clear guidance and policies are needed for choice of priorities and activities. ICLARM needs to keep in mind that CGIAR centers should, by their very nature, focus on those activities that produce significant international public goods, i.e., results that benefit more than one country and that most likely would not be produced by one country alone.

In fact, the Panel is encouraged that ICLARM is moving towards finalizing a cohesive strategic view of its role, its aims and its activities over the next 20 years. The Panel commends the center on being forward looking and setting its sights on priorities agreed to by its vast array of stakeholders. Such a vision - and the exhaustive analysis that preceded its formation - should help the Center achieve the level of resource support needed to move it effectively to a new level of contribution to the advancement of sustainable LARM on a global basis.

ICLARM has made significant contributions to LARM over its lifetime. Particularly in the last 5-10 years, it has been able to consolidate and productively utilize at the policy level the knowledge it has generated. However, the demands on ICLARM expand as the issues grow, particularly because the global community quite correctly sees it as the only global research institution working on LARM issues. Thus, ICLARM is called upon to provide input and involvement in international activities far beyond what its actual \$11 million of resources can support. The Panel is pleased that ICLARM has been able to respond to the many demands on its expertise and time in a rational way, for the most part limiting its activities to those that can be adequately supported by available resources and fit within its priorities. And, in fact, it has seen steady and significant increases in its budget over the past few years. At the same time, the Panel sees that the opportunities and needs are orders of magnitude greater than can be handled by ICLARM.

Aquaculture and fisheries research are where agricultural research was 50 years ago. Capture fisheries and aquaculture are for the most part still dealing with wild species. Only a few examples of successful breeding for productivity increases exist - including, of course, ICLARM's own experience with the GIFT project. As in the early days of agricultural research, the potentials are immense for major breakthroughs and productivity gains through simple, yet more sophisticated selection and breeding. In a parallel fashion, LARM policies are in their infancy in many countries, and work on institutional issues can have major payoffs, such as in the case of ICLARM's work on co-management of community fisheries.

As the only global research institution dealing with LARM, the Panel believes that ICLARM stands in the center of the select group of research institutions that can provide information and research results that will be critical in assuring major future contributions of LARM to poverty alleviation, food security and environmental stability and enhancement.

**The Panel recommends that ICLARM (1) continue on the path it is on, deviating to new themes only as a complement to its current activity, (2) seek additional resources to capitalize on new advances in science that create significant potentials for breakthroughs in living aquatic resources management.**

The 1997 TAC Priorities Report used a total global value of fisheries production of \$25 billion, based on FAO statistics at the time. More recent revised estimates from FAO place the total value of fisheries production at \$132 billion. While there may be a difference in approach underlying the recent vs. earlier estimates, it appears to the Panel that in the past the fisheries sector may have been considerably undervalued in terms of its contributions. Each potential future donor obviously has to assess in its own way the potential payoffs from additional investment in the sector. However, **the Panel feels that there is strong justification for putting more resources into assuring that the potential contributions of fisheries to human welfare are met in the twenty first century.**

## ACKNOWLEDGEMENTS

The Panel wishes to put on record its sincere appreciation to the Management and staff of ICLARM for their outstanding efforts in supporting the EPMR. ICLARM's background documentation and technical presentations were timely and of high quality, the logistical arrangements excellent and it is difficult to imagine a level of cooperation, assistance and positive spirit that would go beyond what was given to the Panel.

Particular thanks are due to Meryl Williams, Director General, Peter Gardiner, Deputy Director General Program, and Ed Sayegh, Associate Director General for Corporate Services, who served as focal points to the Panel throughout the review process. They were helpful at all times, provided hospitality whenever they had an opportunity and did everything possible to make sure the Panel could conduct its work under optimal circumstances. ICLARM staff, including each one of the Program Leaders, and the Director for International Relations, without exception did their very best. The Panel is also grateful to the large number of ICLARM staff both at Headquarters and in Outreach locations that respond to its questionnaire. Thanks are also due to the Chair of the Board of Trustees, Kurt Peters and Vice Chair, John Dillon, and the members of the Board for the positive interactions.

The Panel visited ICLARM's collaborative research facilities in Egypt, Malawi, Solomon Islands and the Philippines. Thanks are particularly due to Roger Rowe, John Craig, Abdel Rahman El Gamal, Randy Brummett, Daniel Jamu, Johann Bell, Idris Lane, Bing Santos and Gaspar Bimbao. The Panel has particular appreciation for ICLARM's collaborators in Ministries and NARS that met with them during its country visits. They were all extremely helpful. In particular, the Panel appreciated the courtesy of Dr. William Dar, Secretary of Agriculture, representative of the Philippines, the host country; Dr. Saad Nassar, head of the Agricultural Research Center of Egypt, and Dr. Steve Aumanu, Minister for Agriculture and Fisheries in the Solomon Islands. The Panel is also grateful for the excellent interactions it had at ICLARM Headquarters in Manila with Dr. Ruben Sevilleja, Director FAC/CLSU; Dr. Rafael Guerrero, Executive Director, PCAMRD; Dr. Renato Agbayani of SEAFDEC/AQD; Dr. Ida M. Siason, Chancellor, UPV, Dr. Julian Gonzalves, Vice President, IIRR, and Dr. Melchor Tayamen, Head, NFFTRC.

The Panel also gratefully acknowledges the logistical and administrative support provided by Jane Garrioch and Irmi Braun-Castaldi of the TAC Secretariat in Rome during the course of review. Dr. Shellemiah Keya, Executive Secretary of TAC gave the backing. Timni Mahase of the CGIAR Secretariat was also very helpful.

Finally, a very special word of thanks for Rocky Josue and Ariel Aquisap of ICLARM. They worked extremely hard and very long hours and did so with an eternal smile and good humour. Their ability to provide excellent assistance even under intense pressure of time was highly appreciated by the Panel.

## APPENDIX I

### COMPOSITION OF THE PANEL AND BIOGRAPHICAL INFORMATION

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**Expertise:** B.Sc. Forestry, Pennsylvania State University (1961); M.Sc. Forestry, University of Washington (1963); M.A. Economics (1969); Ph.D. Natural Resource Economics, University of Michigan (1969).

**Experience:** 1960: Archaeological Surveyor, Tikal Guatemala, for the University of Pennsylvania; 1961-62: Research Forester, Pacific N.W. Forest and Range Experiment Station, U.S. Forest Service; 1965-68: Forestry Officer, Planning Section and Forest Economics Branch, FAO; 1968-70: Research Associate, School of Natural Resources, University of Michigan; 1970-72: Asst. Professor, University of Minnesota; 1972-75: Associate Professor, University of Minnesota; 1975-present: Professor, University of Minnesota, Department of Forest Resources and Department of Agricultural and Applied Economics (Joint Appointment). Has membership in the Society for International Development, Society of American Foresters, American Economics Association; and American Agricultural Economic Association. He has undertaken numerous consultancies for international organizations including the World Bank, FAO, SIDA, USAID, OECD, and the Rockefeller Foundation. He was a member of TAC (1990-1995). He participated in the TAC Natural Resources Management Study (1995) and the Marginal Lands Study (1996). He was Chair, TAC Standing Panel on Resource Management, Forestry and Agroforestry and Chair of the TAC Standing Committee on External Reviews. Currently Chair of the CGIAR's Impact Assessment and Evaluation Group (IAEG). Has wide experience in Latin America and Asia. Over 160 publications, including books, chapters in books, scientific papers and articles in journals and conference proceedings. Speaks and/or reads Danish, Spanish, Swedish, Norwegian, Italian and Portuguese.

**Name: CAPISTRANO, Doris (Philippines)**

**Position:** Program Officer, Ford Foundation (India and Nepal)

**Expertise:** Resource economics and management

**Education:** B.S. Business Economics, University of the Philippines (1978); M.S. Agricultural Economics, University of the Philippines at Los Banos (1983); Ph.D. Food and Resource Economics, University of Florida (1990).

**Experience:** Instructor in Economics, Jan. 1979 - Dec. 1984, College of Development Economics and Management, University of the Philippines at Los Baños, 1979-84; Study Leader, Policy Development and Socio-economic Studies, Program on Environmental Science and Management, University of the Philippines at Los Banos, 1980-84; Research Intern, Environment and Policy Institute (EAPI), East-West Center, Honolulu, Hawaii, 1983 and 1985; Graduate Research Assistant, Food and Resource Economics, Institute of Food and Agricultural Sciences, University of Florida, 1986-89; MacArthur Foundation Post-doctoral Teaching and Research Fellow, Tropical Conservation and Development, Center for Latin American Studies, University of Florida, 1990-91; Program Officer, Rural Poverty and Resources, Ford Foundation, Bangladesh, 1991-96; Program Officer, Community Land Management for India and Nepal, Ford Foundation, India, 1997-present. Member of the American Economic Association, International Association for the Study of Common Property, International Society for Ecological Economics, Honor Society of Phi Kappa Phi, and Gamma Sigma Delta Honor Society of Agriculture. Has over 20 publications including book chapters, journal articles and conference papers on forestry and fisheries resource management and policy. Designed and developed the Ford Foundation's Community-based Fisheries Management Program for Bangladesh. Extensive experience with forestry and fishery resource management program design, development and evaluation.

**Name:** CHOU, Loke-Ming (Singapore)

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**Education:** B.Sc. (Hons) Zoology, University of Singapore (1969); PhD (Zoology), University of Singapore (1975).

**Experience:** 1972-77: Head, Science & Education Dept., Singapore Science Center; 1977-82: Lecturer, University of Singapore; 1982-88: Senior Lecturer, National University of Singapore; 1988-98: Associate Professor, National University of Singapore; 1998–Present: Professor, National University of Singapore, Department of Biological Sciences. Directed the formation of the University's Tropical Marine Science Institute from 1996 to 1998 and presently a member of its Management Board. Currently holds positions in the Councils of the International Coral Reef Society, Singapore Institute of Biology, Association of Southeast Asian Marine Scientists, and Board member of Coastal Management Center, Philippines. Also member of the Scientific and Technical Advisory Committee of the Global Coral Reef Monitoring Network, Commission on National Parks and Protected Areas (East Asian Seas), and the Health of the Oceans Panel. Undertaken consultancies for international organisations including UNEP, IMO, AUSAID, and involved with coral reef and coastal management studies in East Asia. Over 200 publications, including journal papers, books, chapters in books, papers in conference proceedings.

**Name:** MACHENA, Cecil (Zimbabwe)

**Position:** Director, Africa Resources Trust, Zimbabwe

**Expertise:** Fisheries Ecologist, Wildlife Ecologist

**Education:** BSc. Hons. (Zoology), University of Ibadan, Nigeria (1979); M.Sc. (Tropical Resource Ecology) (1984), University of Zimbabwe; PhD (Aquatic Ecology), University of Uppsala, Sweden (1989).

**Experience:** 1980: High School Teacher; 1982 - 1984: Ecologist, Lake Kariba Fisheries Research Institute (LKfri); 1984 - 1991: Counsellor, Kariba Town Council and Chairmen of Staff and Policy Committee; 1985 - 1986: Ecologist and Officer-in-Charge (LKfri); 1986 - 1990: Steering Committee Member, FAO/IFIP Project (Inland Fisheries Project for the big Inland Lakes of Africa; 1987 - 1994: Senior Ecologist and Officer-in-Charge (LKfri); 1988 - 1997: Manager, Zambia/Zimbabwe Lake Kariba Fisheries Project; 1989 - 1992: Zimbabwe Government Negotiator at the Inter-Governmental Negotiating Committee, Convention on Biological Diversity; 1994 to date, Lecturer, Fisheries Planning and Management, University of Namibia; 1995 - 1998: Principal Ecologist and Acting Deputy

Director, Department of National Parks and Wildlife Management (DNPWLM), Zimbabwe; 1995 - 1998: Scientific Authority for the Cites Convention, Zimbabwe; 1996 - 1997: Focal Point, Convention on Biological Diversity, Zimbabwe; 1999: Director, Africa Resources Trust. Has participated in many Conferences of the Parties for the Convention on Biological Diversity including being Chairman of the Africa Group in 1984 and 1985 and Being a Member of the CBD Bureau in 1986. Has participated in several CITES COP meetings. Has intense interest in whaling issues and has on several occasions attended International Whaling Committee Meetings. Has over 40 publications covering aquatic, fisheries, wildlife and environmental issues, including chapters in books, scientific papers, articles in journals and conference proceedings. Has attended many conferences and workshops including those covering marine and coastal issues. Has traveled widely.

**Name:** NOOLAN, Julie A. C. (Australia)

**Position:** President, The Carroll Group, Inc., USA

**Expertise:** Management, finance, Boards, training, information science, change management

**Education:** Registration Certificate, Library Association of Australia (1964); M.A. Library and Information Science, University of Chicago (1968); M.B.A. Finance and Marketing, University of Chicago (1983); Ph.D. Sociology of Science, University of Chicago (1974), Post-graduate Certificate, Organization and Systems Development, Gestalt Institute of Cleveland (1992).

**Experience:** 1961: Library Associate, State Library of South Australia; 1962-66: Director of Libraries, Repatriation Department, South Australia; 1968-72: Instructor, Graduate Library School, University of Chicago; 1972-77: Director of Training, Medical Library Association; 1972-90 Senior Lecturer in General Management and Financial and Cost Accounting, University of Chicago; 1977-84: Executive Director, Association of College and Research Libraries; 1984-90: General Management Consultant focusing on strategic planning, market strategy and acquisition analysis; 1990 - Present: President, The Carroll Group, Inc., Management and Organization Development Consultant; 1995 - Present, Professorial Lecturer American University, Washington, D.C. Graduate School of Public Affairs. Has served on nine national and international Boards including the American Society for Information Science (1985-87, elected President in 1986) and the National Training Laboratories for Applied Behavioural Science (1992-96). Has undertaken numerous consultancies for international organizations including the World Bank, Fulbright Commission, USAID and the Academy for Educational Development. She served on the Boards of IPGRI (IBPGR and INIBAP) and ICARDA (1992-98). Participated in the EPMR of ILCA (1992) and IRRI (1992) and served on CCERs for the Americas Group of IPGRI (1996), Human Resources Development, Information and Documentation for ICARDA (1997) and as the Board observer for the ICARDA CCER on Finance and Administration (1998). Published three books and more than 20 journal articles on information management, change management, Boards, and strategic planning.

**Name:** WELCOMME, Robin (U.K.)

**Position:** Senior Research Fellow, Imperial College, University of London, UK.

**Expertise:** Inland Fisheries ecology and management

**Education:** B.Sc. University of London (1962); Ph.D. Inland Fish Ecology, University of East Africa (1969).

**Experience:** Fishery Research Officer, EAFFRO, Jinja, Uganda, 1963-67; Fishery Expert, FAO, Dahomey, 1968-71; Fisheries Resources Officer, FAO, Rome, 1971-80; Senior Fisheries Resources Officer, FAO, Rome, 1981-89; Chief, FIRI, FAO, Rome, 1989-97; Present, Senior Research Fellow, Imperial College, University of London; Secretary, European Inland Fisheries Advisory Commission, 1987-97; Technical Secretary, Committee on Inland Fisheries for Africa, 1975-90; Committee on Inland Fisheries Advisory Commission, 1972-87; Indo-Pacific Fisheries Council, Working Party on Inland Fisheries, 1976-86. Member: American Fisheries Society; Institute for Fisheries Management (UK). Has visited over 70 countries on inland fisheries and aquaculture issues in Europe, Asia, Africa, Latin America and North America. Author of over 120 publications including books, chapters in books, articles in scientific journals and conference proceedings. Speaks and/or reads English, French, Italian, Spanish and Portuguese.



**TERMS OF REFERENCE**  
**FOR EXTERNAL PROGRAMME AND MANAGEMENT REVIEWS**

**BACKGROUND**

**Context**

1. The Consultative Group on International Agricultural Research (CGIAR) is an informal association of over 50 members that supports a network of 16 international research centres in agriculture, forestry and fisheries. The CGIAR aims, through its support to the Centres, to contribute to promoting sustainable agriculture for food security in developing countries. Because the Centres constitute the core of the CGIAR, the effectiveness of each Centre is crucial to the continued success of the CGIAR (as a System).
2. Each Centre is an autonomous institution operating within the mandate assigned to it by the CGIAR, and is governed by a legally constituted Board that has full fiduciary responsibility for managing the Centre. To ensure accountability in an essentially decentralized system, each Centre is expected to be responsive to the CGIAR, which provides financial support for its work.
3. The CGIAR has established a tradition of External Programme and Management Reviews (EPMRs) to provide a mechanism of transparency and accountability to the Members and other stakeholders of the CGIAR System. EPMRs are joint responsibility of TAC and the CGIAR Secretariat, and are conducted for each Centre approximately every five years. As each Centre is autonomous, EPMRs provide a measure of central oversight and serve as an essential component of the CGIAR's accountability system.

**Integrated System of Reviews of Each Centre**

4. Besides the EPMRs, Centre Commissioned External Reviews (CCERs) are undertaken at each Centre. These CCERs are commissioned by the Centre Boards to periodically assess the quality and effectiveness of particular aspects of a Centre's work. The terms of reference (TORs) for each CCER are determined by the Centre, based on broad principles endorsed by the CGIAR at ICW95 (ref. Document entitled Improving the Quality and Consistency of CGIAR's External Centre Reviews, dated October 24, 1995).
5. EPMRs complement the CCERs by providing a CGIAR-commissioned and comprehensive external assessment of the Centre's programme and management, especially its future directions and the quality and relevance of its research. The TORs for the EPMRs (which update the "standard TORs" endorsed by the CGIAR at MTM95) are provided below. Guidelines for undertaking the reviews are issued separately.

## **TERMS OF REFERENCE**

### **Objectives and Scope**

6. EPMRs seek to inform CGIAR members that their investment is sound, or recommend measures to make it so. Members of the CGIAR and other stakeholders can be informed whether the Centre is doing its work effectively and efficiently. EPMRs are both retrospective and prospective; and help ensure the Centre's excellence, relevance and continued viability, and the CGIAR System's coherence. Each review is expected to be strategic in orientation and as comprehensive as the situation warrants.

7. The broad objectives of EPMRs are to: a) provide CGIAR members with an independent and rigorous assessment of the institutional health and contribution of a Centre they are supporting; and b) to provide the Centre and its collaborators with assessment information that complements or validates their own evaluation efforts, including the CCERs.

8. The EPMR panel is specifically charged to assess the following:

- a. The Centre's mission, strategy and priorities in the context of the CGIAR's priorities and strategies;
- b. The quality and relevance of the science undertaken, including the effectiveness and potential impact of the Centre's completed and ongoing research;
- c. The effectiveness and efficiency of management, including the mechanisms and processes for ensuring quality; and
- d. The accomplishments and impact of the Centre's research and related activities.

## **TOPICS TO BE COVERED**

### **A. Mission, Strategy and Priorities**

- The continuing appropriateness of the Centre's mission in light of important changes in the Centre and its external environment since the previous external review.
- The policies, strategies, and priorities of the Centre, their coherence with the CGIAR's goals (of poverty alleviation, natural resources management, and sustainable food security), and relevance to beneficiaries, especially rural women.

- The appropriateness of the roles of relevant partners in the formulation and implementation of the Centre's strategy and priorities, considering alternative sources of supply and the benefits of partnerships with others.

**B. Quality and Relevance**

- The quality and relevance of the science practised at the Centre.
- The effectiveness of the Centre's processes for planning, priority setting, quality management (e.g., CCERs, peer reviews and other quality and relevance assured mechanisms), and impact assessment.

**C. Effectiveness and Efficiency of Management**

- The performance of the Centre's Board in governing the Centre, the effectiveness of leadership throughout the Centre, and the suitability of the organization's culture to its mission.
- The adequacy of the Centre's organizational structure and the mechanisms in place to manage, coordinate and ensure the excellence of the research programmes and related activities.
- The adequacy of resources (financial, human, physical and information) available and the effectiveness and efficiency of their management.
- The effectiveness of the Center's relationships with relevant research partners and other stakeholders of the CGIAR System.

**D. Accomplishments and Impact**

- Recent achievements of the Centre in research and other areas.
- The effectiveness of the Centre's programmes in terms of their impact and contribution to the achievement of the mission and goals of the CGIAR.

## Appendix III. ICLARM's Response to the Recommendations of the 1995 Mid Term Review

MTR Recommendations	Center's Response and Panel's Comments
<p><b>Recommendation 1:</b> That the Director General give urgent attention to the issue of cash flow management. (Chapter 3, Recommendations of the 1992 EPMR and Response Thereto, Section 3.4 Page 9, para 2).</p>	<p><b>Center's Response:</b> Cash flow management remains an issue for ICLARM. Problems of late remittances from unrestricted core and project donors continue to be severe in certain cases. For example, one major core donor still has not remitted the second half of the 1997 core contribution, nor the whole of the 1998 contribution. That donor's 1996 contribution was only remitted late in 1998. Several 1998 contributions are still outstanding. After an improvement in the timeliness of core remittances across the CGIAR in 1996, some donors slipped in remittance schedules in 1997 and thereafter. In 1997 and 1998, the strengthening of the US dollar against all other currencies caused severe budget losses for ICLARM but these were managed by cutting budget allocations and other cost savings measures.</p> <p>The following steps are taken to ensure that cash flow is maintained in a healthy state:</p> <ul style="list-style-type: none"> <li>• A small cash reserve has been set aside for emergencies;</li> <li>• Close monitoring of currency exchange rates and periodic adjustment of the annual budget to accommodate any negative impacts;</li> <li>• Careful monitoring of cashflow and regular review of this information by management;</li> <li>• Persistent follow-up on all donor receivables and close monitoring of due dates for project technical and financial reports so as to complete the Center's obligations to the donors in a rigorous and timely manner;</li> <li>• Increasing conservatism in framing annual budgets;</li> <li>• Negotiating for better payment terms in new contracts; and</li> <li>• Management is maximizing investment returns/income on idle and reserve funds.</li> </ul> <p><b>PANEL'S COMMENTS</b></p> <p><i>This is continuing problem for the Center. ICLARM management is responding well in the ways over which it has control. The only way it could improve its situation further would be to budget operating reserves each year which would then impact its ability to fund research from unrestricted funds.</i></p>

<p><b>Recommendation 2:</b> That the team participating in the next full-scale external review investigate more fully progress in implementing and gaining acceptance of an orderly administrative system. (Chapter 3, Recommendations of the 1992 EPMR and Response Thereto, Section 3.4 Page 9, para 5).</p>	<p><b>Center's Response:</b> This recommendation has been handled through:</p> <ul style="list-style-type: none"> <li>• A detailed and integrated program of reviews, policy and systems development, proposed by management and overseen by the Board. A full review of the (then) Management Services Division was conducted as an internally commissioned external review in April 1996;</li> <li>• Formation of an Executive Management Team inside ICLARM which formally monitors progress with the administrative system on a weekly basis;</li> <li>• Recruitment, with some initial difficulty, of a new Associate Director General/Corporate Services having an outstanding level of technical competence, and with the personal abilities to bring about the necessary improvements;</li> <li>• Recruitment of several key senior Corporate Services staff to bring ICLARM's skills base up to a suitable level;</li> <li>• A comprehensive, and ongoing, reorganization of Corporate Services Division, its values and modus operandi to bring corporate support to the necessary standard;</li> <li>• An ongoing program of integrating the policies and procedures of outreach sites with those of Headquarters; and</li> <li>• A concerted, and often frustrating, effort to locate a headquarters site for ICLARM so as to provide the Center with quarters suitable to its mission.</li> </ul> <p><b>PANEL'S COMMENTS</b></p> <p><i>Enormous strides have been made. Completion of all systems that are not impacted by the lack of satisfactory headquarters facility is close at hand.</i></p>
<p><b>Recommendation 3:</b> That, in considering the Egyptian facilities, due consideration be given not only to administrative, financial and logistical aspects but also to the technical issues surrounding the feasibility of the proposed sites for ICLARM's research activities, against the framework of ICLARM's strategic plan and the implications for ICLARM's priorities. (Chapter 5, Research and Headquarters Facilities, Page 16, para 2).</p>	<p><b>Center's Response:</b> The Mid Term Review was conducted just weeks after the Egyptian offer was first mooted in late November 1994 and before it was announced formally in February 1995 at the ministerial level meeting of the CGIAR in Lucerne, Switzerland.</p> <p>After careful consideration and research planning<sup>1</sup>, the ICLARM Board made its final decision in April 1996 and authorized management to develop medium term plans for the use of the facility for two major purposes:</p> <ol style="list-style-type: none"> <li>1. As a hub for ICLARM's collaborative research and training activities in Sub-Saharan Africa and WANA region, utilizing to the degree feasible modern communications and educational techniques and systems, and as the first priority, addressing food security, policy and human resource issues through collaborative research with partners in the region; and</li> <li>2. As a site for selected upstream ecoregional and global research relating to topics such as: biological diversity; natural resource management; genetic conservation, monitoring and improvement; health and nutrition of aquatic species; policy issues relating to fisheries, aquaculture and other aquatic resource uses.</li> </ol>

<sup>1</sup> A preliminary planning conference was held in September 1995 in Egypt and the proceedings published in Annala. J.H. (Ed.) 1997. Fisheries and Aquaculture Research Planning Needs for Africa and West Asia. ICLARM Conf. Proc. 50. 80 p. The results of this conference and other internal planning activities were encapsulated in two submissions to TAC, in December 1995 and March 1996.

At the Mid Term Meeting of the CGIAR in May 1996, the CGIAR endorsed the ICLARM Board decision, and advised it to note the reservations expressed by the TAC and some members. The Board has proceeded accordingly.

Major milestones to date include:

- Senior ICLARM staff appointed and began to take up duties in January 1997;
- Refurbishment commenced in March 1997;
- Host country agreement signed between the Government of Egypt and ICLARM in March 1997, and ratified by Parliament in December 1997 and gazetted on 11 December 1997;
- Official opening held on 25 May 1997 in association with the CGIAR MTM which was held in Cairo;
- ICLARM assumed management responsibility for the site and staff from May 1997 and selected local research projects for implementation on the site;
- In mid 1997, preparation of funding proposals commenced for international and regional work out of the site;
- National staff from the former national laboratory at Abbassa selected for work with ICLARM from January 1998;
- Phase I refurbishment completed in June 1998; Phase II commenced;
- Research commenced in 1998, in addition to the ongoing national level research included two genetics projects funded at the site, initiation of a survey of African fish health problems; Lake Nasser fish production studies and research planning. Several projects have been submitted to donors, of which two further fish genetics studies look likely to be funded in early 1999;
- International conference on the fisheries of Lake Nasser held in September 1998;
- Changes in research personnel in 1999 expected to accelerate research development, especially in African regional research;
- Program of regional visits by senior Abbassa and HQ staff during 1998 has produced several potential collaborations which will be pursued vigorously in 1999; and
- Close integration maintained between the planning for Abbassa based work and that developed at other ICLARM sites, including HQ and Malawi, and in developing the new ICLARM Strategic Plan.

#### PANEL'S COMMENTS

*The Center followed this recommendation, and currently is preparing a detailed research plan for Abbassa and Africa-West Asia.*

<p><b>Recommendation 4:</b> That ICLARM's Board and management continue to investigate the opportunities for a headquarters site and capital facilities in the Philippines. (Chapter 5, Research and Headquarters Facilities, Page 16, para 3).</p>	<p><b>Center's Response:</b> The effort to secure an appropriate headquarters site has been a priority for the Board and management yet has received many setbacks since the MTR. As of January 1999, however, the Board is in a position to make a choice between two apparently suitable sites, one at Subic Bay in the Philippines and the other in Penang, Malaysia. Sites outside the Philippines were sought from late 1997 as part of the Board's two-track approach, resulting from mounting frustration at the lack of progress in the Philippines. At one stage, informal interest was also shown by the city of Darwin in Australia but the Board did not pursue this option.</p> <p>As predicted at the time of the MTR, the Philippine Government signed a new headquarters agreement with ICLARM to replace the one that was abolished in 1987 under the Aquino Government. The new HQ agreement was signed with the Department of Foreign Affairs in November 1995 and passed as Senate Resolution No 62 by the Senate in October 1996.</p> <p><b>PANEL'S COMMENTS</b></p> <p><i>The Center has moved ahead with this issue and is ready to come to a decision on it during the February 1999 Board meeting, assuming all necessary documentation is in hand.</i></p>
<p><b>Recommendation 5:</b> That the Director General give urgent attention to the further strengthening of scientific and management capacity within ICLARM programs to ensure a sustainable long term effort by the Center. (Chapter 6, ICLARM's Capacity to Deliver an Effective Research Program, Section 6.4, Page 18, para 3).</p>	<p><b>Center's Response:</b> This recommendation was addressed and continues to be addressed through:</p> <ul style="list-style-type: none"> <li>• A major restructure of the Center, implemented in 1996, which introduced a new program structure and which installed a Deputy Director General/Programs with considerable research planning, management and CGIAR experience;</li> <li>• Some enlargement of the program including the hiring of more social science expertise through projects and core, managed largely through the new Policy Research and Impact Assessment Program;</li> <li>• Hiring of new high quality staff as vacancies arose. The recent track record of ICLARM in attracting good, international staff has been generally good except for some field in which the potential pool is still small, e.g. fish quantitative genetics and biodiversity studies;</li> <li>• Management training for research staff;</li> <li>• Involvement of the research staff in management decisions and policy making;</li> <li>• Ongoing efforts to capture individual knowledge and experience in institutional products such as project and program plans, proposals for funding, publications, training materials, etc;</li> <li>• Making efforts to maintain good contacts with alumni, including, in some cases, through their continued involvement in ICLARM projects; and</li> <li>• Plans to focus all future resource mobilization efforts on multi-disciplinary projects which would involve cross-program and cross-site teams.</li> </ul>

	<p><b>PANEL'S COMMENTS</b></p> <p><i>Management is making efforts to recruit good scientific staff and to diversify the range of expertise in line with the needs of the program and the financial possibilities. However, the panel felt that the ten-year limit on staff tenure is a serious impediment to recruitment and retention of staff in the age range and experience most appropriate to the needs of ICLARM.</i></p>
<p><b>Recommendation 6:</b> That ICLARM should make every possible attempt to turn the challenge of increased competition for funds from capable NARS and the more internationally assertive Advanced Scientific Institutes into opportunities for positive strategic alliances. (Chapter 6, ICLARM's Capacity to Deliver an Effective Research Program, Section 6.8, Page 22, para 3).</p>	<p><b>Center's Response:</b> In 1996, ICLARM developed a Partnership Policy that has had a powerful effect on thinking and behaviour with respect to partnerships. As part of the 1996 restructure, we created an International Relations Office, with a Director who is a member of the Executive. This office and the International Partnerships and Networks Program which the Director oversees has been an outstanding success, facilitating not only the partnerships approach and policy of ICLARM but also assisting the programs to develop and formalize partnerships for research. A current focus of the office is evaluating the success and failure factors for ICLARM partnerships and determining strategies for continuing project-specific partnerships beyond the life of the projects. A specific case of using advanced institutes is seen in the International Network for Genetics in Aquaculture (INGA), which recently invited the main advanced institutes to partake as observers and received positive responses from 10 institutes which will join the 13 developing country members at the March 1999 meeting.</p> <p><b>PANEL'S COMMENTS</b></p> <p><i>ICLARM has systematically and effectively addressed this recommendation. The Center has clarified its policies and strategy for partnership and has created a focal program to coordinate and manage this partnership. Previous tensions and ambiguities in its relationship with other international research institutions have been resolved. ICLARM has entered into strategic alliances with advance research institutions which have enriched its programs and enhanced its ability to leverage donor funding.</i></p>
<p><b>Recommendation 7:</b> That ICLARM be allocated the additional US\$1 million which TAC conditionally recommended based on the outcome of the Mid-Term Review. (Chapter 6, ICLARM's Capacity to Deliver an Effective Research Program, Section 6.9, Page 22, para 3).</p>	<p><b>Center's Response:</b> This was subsequently agreed to by the CGIAR, but, with the funding procedures then in place, about one third of the contribution was not obtained in unrestricted core because of ICLARM's direct success in raising funds for projects within the core agenda. The CGIAR funding procedures were changed in May 1996 to overcome this type of problem and others.</p> <p><b>PANEL'S COMMENTS</b></p> <p><i>The Panel has no further comments.</i></p>



<p><b>Recommendation 8:</b> That consideration of the issue of inadequate resources be given high priority by TAC and the development assistance community. (Chapter 7, The Appropriateness of the Available Scale of Resources to Implement the Agreed Core Research Program, Page 24, para 3.)</p>	<p><b>Center's Response:</b> ICLARM has made many efforts over the years since the MTR to raise the profile of aquatic resource issues in the CGIAR and related form. Our success has been limited although the CGIAR and TAC now seem to hold a degree of comfort with ICLARM as a center and with its mission that was missing before. Nevertheless, the disappointing lack of aquatic resource, water, forestry, livestock and natural resource management knowledge and vision displayed in the recent CGIAR System Review by Maurice Strong and colleagues was cause for despair.</p> <p><b>PANEL'S COMMENTS</b></p> <p><i>The Panel has no further comments.</i></p>
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## **APPENDIX IV: ICLARM's NINE PROGRAMS**

### **4.1 AQUATIC ENVIRONMENTS PROGRAM (AEP)**

**Program Context.** The restructuring of ICLARM's research effort in 1996 resulted in the formation of the Aquatic Environments Program (AEP). The AEP aims to improve sustainable use and conservation of aquatic habitats, especially coral reefs (by assessing and limiting their degradation), and to facilitate decision-making in coastal zone management. It supports CGIAR's objectives of saving biodiversity and protecting the environment; and has a strong focus on strategic research. Its activities are designed to have significant impact at the global (tropical and subtropical) scale. The program is led by a senior scientist, and has 9 research and 1 secretarial staff.

**Projects managed within AEP.** The main projects are:

- **ReefBase (Oct 1996 – Sep 2000).** This is intended to be a global database on coral reef condition and reef-related initiatives, and will be used as a data repository by the Global Coral Reef Monitoring Network. An important component activity is Rapid Assessment of Management Parameters (RAMP) which forms a connection to human behavior as well as political, socioeconomic and cultural variables. These can be used to assess, predict and potentially manage human behavior, and will raise the management and decision-support capacity of ReefBase.
- **Population Interdependencies in the South China Sea Ecosystems (PISCES) (Jan 1997 – June 1999).** This project focuses on the nature and degree of interdependencies of selected reef species from six sites in the South China Sea and adjacent area, and estimates relative contributions to a mixed stock. It will facilitate development of improved management strategies for living resources based on information on the interconnections among marine populations.
- **Coastal Management Training Program (CMTP) (1997 – 2002).** This activity is primarily focused on enhancing capacity of coastal managers at provincial and municipal levels through development of relevant training materials. Currently, it is focusing on the situation in the Philippines, but the training packages so developed are expected to be adapted for use elsewhere, and development of a global certification system for trainers is intended.
- **Population Consumption and Environment (PCE) (1997-2000).** Through this activity, ICLARM coordinates a network of projects conducted by institutions in several countries: India (Goa), Madagascar, Congo, Zambia, El Salvador, Honduras, Ecuador, the Galapagos, Micronesia, and the Philippines (Palawan). It addresses issues relevant to coastal management and their relationships to human population densities and migration. ICLARM's main role is to identify common principles that could guide the design of future coastal management projects.

**Program Planning and Implementation.** AEP activities were formulated on the basis of a global needs assessment, activities undertaken by other institutions, and ICLARM's comparative advantage. Details are determined through ongoing consultation with relevant NARS and ARI partners. This approach ensures relevance of projects to developing countries, and the commitment of external partners.

Project progress is monitored and evaluated through ICLARM's management system of intra-and inter-program meetings, annual (at least) formal reports prepared for review teams and donor agencies, and internally-commissioned external reviews (ICERs).

**Programmatic Links.** The AEP is based at ICLARM headquarters and has a natural linkage with some of ICLARM's other programs such as the Coastal Aquaculture and Stock Enhancement Program (CASEP) and Fisheries Resources Assessment and Management Program (FRAMP). It has extensive collaboration with external partners. There are plans to link ReefBase and RAMP to UNEP Regional Seas Programs through collaboration with the International Coral Reef Initiative (ICRI) and the Global Coral Reef Monitoring Network (GCRMN). It is also formally linked to the World Conservation Monitoring Center (WCMC), and has informal links with NASA, NOAA, US National Center for Atmospheric Research. RAMP is undertaken in collaboration with the University of Rhode Island.

PISCES is implemented through strong collaborations with research institutions in Southeast Asia and adjacent countries (Malaysia, Vietnam, Taiwan, Indonesia, Philippines and the Solomon Islands). PISCES and CMTP will also be linked to ReefBase, RAMP and supportive activities by other institutions, to form an International Coral Reef Action Network (ICRAN).

**Outputs and Impacts.** AEP has a number of major outputs, including:

- Distribution of over 1000 ReefBase CD-ROMs worldwide, with the 3<sup>rd</sup> annual version released recently
- ReefBase data has contributed to the 1995 "State of the Reefs Report" for the Global Workshop of the International Coral Reef Initiative, and to the 1998 "Reefs at Risk Report" by World Resources Institute, ICLARM and WCMC
- ReefBase Aquanaut Reef Monitoring Method and RAMP socioeconomic field protocols are important standards adopted by the Global Coral Reef Monitoring Network
- CMTP training manuals
- Over 30 publications (including 20 formally reviewed scientific papers) since program inception in 1996.

The global reports of coral reefs to which ReefBase contributed greatly generated much publicity and media coverage (including by CNN and in the National Geographic magazine). AEP activities will provide the information needed for the formulation of useful management strategies for coastal resources. Two hundred Philippines coastal managers have been trained under the CMTP, and globalization of this training will enhance the capacity of NARS managers of coastal and coral reef resource systems.

**Strategy and Priorities for the Future.** AEP will continue to expand ReefBase activities, focus on socioeconomic factors in reef management and ecological linkages among reefs, initiate global analyses of the economic and fisheries value of coral reefs, and develop a global training program for reef management. It has initiated a joint activity with UNEP and the United Nations Foundation to develop an International Coral Reef Action Network (ICRAN) aimed at catalyzing the implementation of global and regional frameworks to reverse coral reef degradation. Funding was recently approved by the UN Foundation. The AEP is also assisting NOAA and other organizations to develop and coordinate a "Global Inventory of Coral Reefs (GICOR)", which will systematically sample the world's continental shelves to include uncharted reefs.

The Mid-Term Review in 1995 noted that the program responded positively to the recommendations of the 1992 EPMR and that its planned activities address all the critical research issues relating to the sustainable utilization of coastal and coral reef resource systems although in a compact manner as dictated by funding constraints. Since then the

Program went through a CCER in August 1998, and the recommendations were endorsed by the Board of Trustees at its September 1998 meeting.

The Panel notes that AEP is responding to the recommendations of the ICER, namely that:

- ReefBase should be built on a solid, firm and accurate footing rather than sacrifice quality for quantity
- ReefBase needs to be fine tuned further to focus on viable options to mitigate adverse anthropogenic and other impacts (include “Best Practice Guide”) and to be linked to MPA field studies
- Aquanaut training program and associated reef survey methodology be devolved through appropriate global partnerships to assist its implementation
- RAMP needs further field testing and effort be directed to obtain assistance of partners willing to support it
- every attempt be made to make PISCES sustainable at least until a regional model could be generated
- the CMTP course be re-organized to emphasize coral reefs and ReefBase and developed internationally either through a fully funded AEP staff member or if anticipated funding is not forthcoming, through an NGO or other group or agency

#### 4.2 BIODIVERSITY AND GENETIC RESOURCES PROGRAM (BGRP)

**Program Context.** The Biodiversity and Genetic Resources Program (BGRP) was formed in 1996 to sharpen ICLARM’s focus on these issues which are of growing international importance. This program, following restructuring of research activities, incorporated several established activities and has as its main objective to contribute, through multiple partnerships, to the characterization, evaluation and conservation of aquatic biodiversity and genetic resources, for their use in providing food, employment and a healthy environment.

The program is seen as a major contribution to the sustainability of fisheries and aquaculture through the conservation of the biological resources upon which these activities are based. It thus contributes to the objectives of the Convention on Biological Diversity. It collaborates actively with other CGIAR Centers, international agencies working in the field and NARS and thus contributes to the formulation of global consensus on policies and approaches to the management and equitable sharing of living aquatic resources.

The program emphasizes training of NARS and national administrations to assist them to better comply with their obligations under the Convention. It is also executing research programs in collaboration with NARS on genetic composition of a few important species for fisheries and aquaculture. One of its most important activities is the development and custodianship for databases on aquatic biodiversity, which are available to the global community as a point of reference.

**Projects and Networks managed within the Program.** These are:

- Strategic research and development:
  - Fish Biodiversity on the coastal zone: A study on the genetic diversity of the black-chinned tilapia in West Africa
  - Genetic diversity of the silver barb in Asia

- Information and training:
  - Further development of FISHBASE as a global encyclopedia of fisheries
  - Strengthening fisheries and biodiversity management in 55 African, Caribbean and Pacific developing countries
  - LARVALBASE: a global information system on fish larvae
  - Bellagio Conference on Policies for the Conservation and Sustainable Use of Aquatic Genetic Resources
- Advisory, representation and networks:
  - Systemwide Genetic Resources Program (SGRP) and Systemwide Information Network for Genetic Resources (SINGER)
  - Participation in CBD/SBSTTA/FAO/GBF/IUCN meetings
  - Participation in Species 2000: Indexing the World's known species

**Program Planning and Implementation.** The needs and opportunities for the sector as a whole have been identified at a series of meetings convened by ICLARM and by FAO. The work of this program is planned in full consultation with NARS and other partners. The single largest project – FISHBASE – has its own steering committee comprising NARS, representatives of the donors and advanced scientific institutions.

The program has not been the subject of an ICER, although the CGIAR systemwide genebank review was completed in 1996.

**Programmatic Links.** The program is based at headquarters. It communicates regularly with all project sites and partners by e-mail. Within ICLARM it has particularly close links with the GEBP and the FRAMP. In its training activities it collaborates with AEP, CASEP, IPNP and PRIAP.

Externally it has highly effective linkages with other organizations working in the field of genetic resources and biodiversity including the CGIAR Centers (IPGRI, IRRI and CIFOR) and other international organizations (FAO and IUCN). It has contacts with donors including DFID (UK), BMZ/GTZ (Germany) and the Rockefeller Foundation (US). Working collaboration with NARS is being developed, particularly with the WRI (Ghana).

**Output and Impacts.** The program contributes to the Convention on Biodiversity, to its technical body the Subsidiary Body on Scientific, Technical and Technological Advice, and to other expert groups at a time when the Convention was examining aquatic biodiversity.

As the BGRP was only formed in 1996 many of its outputs are the result of ongoing ICLARM activities that were incorporated into it. Outputs include:

- FISHBASE, an electronic encyclopedia covering some 20,000 of the world's 25,000 fish species. This is used by 1,200 registered users in 165 countries.
- Training materials, software related to training in FISHBASE as well as in ECOPATH and FISAT plus extensive lecture notes. This material is used primarily by scientists from around the world and has given rise to citation in more than 90 publications. There are more than 700 registered users of ECOPATH from 75 countries. The model has also been used throughout the world and some 60 different aquatic ecosystems have been characterized using it.
- Three training courses on biodiversity and genetic resources that have trained 51 NARS trainers and policy makers from 30 countries.

- Methods for genetic characterization of species potentially useful in aquaculture
- Numerous publications, contributions to biodiversity and genetic resources documentation, planning and policy formulation.

**Strategy and Priorities for the Future.** The program will build on its past successes to develop further its role as a primary Center for aquatic biodiversity in association with the CBD clearing house mechanism. To do this it would extend the coverage of FISHBASE to include cultured organisms and molecular genetics data. The program also proposes two new activities based on the perceived need to identify threats to the world's freshwater fish species and to improve information and methods for biodiversity management of the fish genetic resources at risk.

#### 4.3 COASTAL AQUACULTURE AND STOCK ENHANCEMENT PROGRAM (CASEP)

**Program Context.** The Coastal Aquaculture and Stock Enhancement Program (CASEP), based entirely at ICLARM's Coastal Aquaculture Center (CAC) in the Solomon Islands, is served by a full complement of about 50 research, administrative and support staff led by a senior scientist. CASEP essentially is a continuation and expansion of the research carried out by CAC before ICLARM's program restructuring in 1996. The program's focus is on developing methods for the aquaculture of giant clams and other reef species.

The main aim is to improve productivity of coral reef fisheries through development of biotechnical systems for the culture of high-value species by village farmers, and cost-effective methods for propagating and releasing juveniles to restore and enhance inshore fisheries. Its thrust continues to be research that can be translated into benefits for coastal villagers by demonstrating that the technology is viable at the pilot commercial scale. The program supports ICLARM's goals of poverty eradication, healthier families, reduced pressure on fragile ecosystems, and people-centered sustainable development.

**Projects managed within CASEP.** These are:

- Village Farming and Restocking of Giant Clams (since 1987; current phase June 1995 – Dec 1999). The project provides for a sustainable increase in coral reef productivity through the farming and restocking of giant clams. This activity has almost no adverse impact on the coral reef environment and enhances rather than diminish the genetic diversity. Its ultimate goal is to develop economically viable giant clam farming industries for coastal villages.
- Development of Village Farms for Blacklip Pearl Oysters in Solomon Islands (since 1993; current phase early 1998 – Dec 2000). Methods for maximizing spatfall collection and minimizing mortality during growout will increase the viability of blacklip pearl oyster farming. CAC had to overcome problems of nutrient-rich inshore waters and predator abundance by developing alternative methods for rearing these oysters for the culture of pearls.
- Development of Methods for Mass-Rearing of Tropical Sea Cucumbers for the Purpose of Enhancing Wild Stocks (since 1993; current phase Jan 1995 – Dec 1999). This project investigates stock enhancement of sea cucumbers on shallow reefs to support sustainable harvesting. It needs to develop cost-effective methods for producing larvae *en masse* and identify strategies for maximizing the survival of released juveniles.

Other recently initiated projects include:

- Determining the ecology of juvenile sandfish, *Holothuria scabra*, for the enhancement of wild stocks

- Development of new artisanal fisheries based on the capture and culture of postlarval coral reef fish
- Effects of alternative logging operations on coral reefs.

**Program Planning and Implementation.** CASEP's research activities address the needs of Pacific nations, determined through consultations and analysis of regional trends in fisheries production; and the results are expected to be relevant to other regions. Consultations to identify aspirations of Pacific nations were done through the planning process for the Medium-Term Plan (with wide circulation of discussion paper throughout the Pacific, and the region's representation on the Scientific Advisory panel). Discussions were also held with senior fisheries officials at regional fora.

These provided the basis for CASEP's focus on high-value reef species that are easy to collect as fry or spat from the wild (or to propagate in hatcheries), inexpensive to rear, and readily marketable through existing infrastructure. Program implementation and progress are monitored and evaluated through ICLARM's management system of intra- and inter-program meetings, regular formal reports prepared for review teams and donor agencies, and internally-commissioned external reviews (the most recent by the Australian Centre for International Agriculture Research (ACIAR) in May 1998).

**Programmatic Links.** CASEP has links to other ICLARM programs through:

- involvement of CAC staff in the PISCES project of the AEP
- collaboration with PRIAP on impact studies
- implementation of a project on the effects of a marine conservation area in Solomon Islands on populations of commercially important invertebrates within FRAMP
- a new project on the effects of alternative logging operations on coral reefs which contribute information to the AEP.

CASEP has ongoing collaboration with numerous external agencies. These include: the Overseas Fishery Cooperation Foundation (OFCF) of Japan, National Institute of Water and Atmospheric Research (NIWA) of New Zealand, Secretariat of the Pacific Community (SPC), the Forum Fisheries Agency (FFA), the Solomon Islands Ministry of Agriculture and Fisheries and Ministry of Forests, Environment and Conservation, James Cook University, Australian Institute of Marine Science, University of the South Pacific, Sydney University, Deakin University and Universite de Quebec, Canada.

**Outputs and Impacts.** CASEP has demonstrated the economic potential of growing out "seed" giant clams for sale to the marine aquarium trade and live seafood trade. This has resulted in the establishment of 26 giant clam farms in the Solomon Islands by villagers who now enjoy a source of income. It has spun-off another sustainable activity: the farming of hard corals for the marine aquarium trade, often done mainly by women. The CAC has established broodstock for 5 species of giant clams and performed field trials to establish the best condition for these species. In the 1980s, ICLARM transported giant clams to the Marine Science Institute (University of the Philippines) and six species were successfully spawned to comprise the broodstock for the emerging Philippine clam farming industry.

The successful modified methods for culturing blacklip pearl oysters to suit the relatively nutrient-rich waters of the Solomon Islands show that large-scale culture is feasible. Should an investor move in, villagers could collect spat, grow them to larger sizes and sell them to the commercial operator. The program has also developed routine ways to produce juveniles of a valuable sea cucumber species in hatcheries. By releasing them into the wild, artisanal fisheries can benefit from the restored spawning stocks that will maintain natural replenishment, and from managed harvesting.

The program has produced 18 scientific publications since 1996 (13 in refereed conference proceedings/journals), with a further 7 manuscripts submitted to peer-reviewed scientific journals.

The programs outputs have contributed to protection of the reef environment. It is also responsible in getting Government intervention to protect wild stocks of giant clams, blacklip oysters and sea cucumbers. Legislation has been introduced prohibiting exports of these species unless they were derived from aquaculture.

**Strategy and Priorities for the Future.** CASEP will focus on research that will improve the value of the products as well as enhance survival and growth rates through manipulation of environmental factors and selective breeding (e.g., colour of mantle in giant clams, pearl quality from wild and cultured oysters). Environmental issues affecting the sustainability of aquaculture and stock enhancement activities will be included (e.g., the effects of logging, the sustainable offtake of reef species).

CASEP will integrate its enhancement activities for aquacultured species with assistance to the Ministry of Agriculture and Fisheries to implement their plan for a seaweed farming industry by carrying out field trials on the suitability of the environment for farming *Eucheuma*. Within five years, CASEP will transfer the responsibility for producing seed clams for the farmers to the private sector. ICLARM seeks to provide research and management advice to countries of the Asia/Pacific through regional bodies (e.g., SPC). The program has the resources to jointly supervise postgraduate students from University of the South Pacific which will establish the Institute of Marine Resources next door to the CAC.

#### 4.4 FISHERIES RESOURCES ASSESSMENT AND MANAGEMENT PROGRAM (FRAMP)

**Program context.** The Fisheries Resources Assessment and Management Program (FRAMP) is made up of the following components:

- **Analytical tools:** stock assessment (e.g., FiSAT); Ecosystem management (Ecopath with EcoSim).
- **Fisheries management:** Marine Protected Areas (MPAs):
  - The role of marine protected areas in fisheries management and biodiversity conservation in coral reef ecosystems (Caribbean)
  - Testing the use of marine protected areas to manage fisheries for tropical coral reef invertebrates (Solomon islands).
  - Regional technical assistance towards strategies and action plans for sustainable management of coral fishery in tropical Asia.

ICLARM has been on the cutting edge of developing software tools for the assessment of tropical fisheries (FiSAT) in collaboration with FAO and ecosystems (Ecopath and EcoSim) in collaboration with the University of British Colombia. The models have revolutionized approaches to tropical stock evaluation with respect to traditional stock assessment methodology. Aquatic ecosystems modeling using Ecopath with EcoSim reveals the structure and interdependencies of the different components of an ecosystem. MPAs are designed to protect and enhance the biodiversity of coral reef and other fisheries. The different FRAMP models and software tools are complimentary. They entail the collection and organization of information on aquatic ecosystems and fisheries to enhance the understanding of the ecosystems, to facilitate applied research and to shed light on the most effective way to manage the ecosystems and fisheries.



**Projects and Networks managed within the Program.** These are:

- Tropical fish stock assessment. FiSAT is a package that combined the earlier ELEFAN and Length Frequency Stock Assessment (LFSA) routines. FiSAT uses length instead of age in determining growth parameters. The method uses the modal progression of fish lengths with each mode representing the average length of a cohort. The use of length substitutes the need to determine the age of the fish which is difficult for tropical situations where age is not clearly determined by season.
- Multispecies management project. Ecopath is a mass-balanced modelling approach that utilizes with EcoSim reveals the trophic structure of ecosystems and the energy or nutrient flows between the various trophic levels. It reveals the interactions between organisms that characterize each trophic level. Tropical marine and freshwater systems are complex with high biodiversity representing many ecotrophic groups and complex food webs. Ecopath with Ecosim adds a dynamic simulation capacity and leads to an increased understanding of trophic interrelationships and community structures of these systems.
- Ecopath models are constructed using simple data that are routinely collected for fisheries assessments. Yet when constructed they give important insights into how the complex ecosystems are functioning. The software too has predictive capacity. How will aquatic systems and fisheries behave under different scenarios? What are the impacts of pollution, overfishing, climatic changes on the ecosystem components? What are the impacts of overfishing a particular trophic group? Where the sizes of the ecotrophic components fluctuate naturally, heavy human intervention will shift the ecotrophic balance. For example, fishing may shift ecotrophic groups towards lower ecotrophic levels. At what levels of disturbance are ecosystems altered irreversibly?
- Marine protected areas project. The Marine Protected Areas project (MPA) is evaluating the possible role of fishery reserves in the management of marine fisheries. The theory behind setting up fishery reserves is to conserve and replenish genetic diversity and enhance recruitment and restoration of depleted stocks. In fishery reserves there are likely to be increases in stock abundances and the average size of individual fish due to reduced disturbance and exploitation. This may benefit adjacent fished areas through outmigrations.
- The Coastal Fisheries Management Project. This Project aims to develop a coastal fishery resource information system that relates environmental and socioeconomic factors to resource management needs of the eight participating countries in tropical Asia. Activities within this project require close interaction with resource managers and policy makers at the national level.

**Program Planning and Implementation.** Programs are conceived from research ideas which are subjected to consultations with potential participants and institutions and elaborated at workshops. ICLARM is well known for the development of its fish stock assessment methodology (ELEFAN), which has been combined with the FAO program (LFSA) to result in FiSAT.

The Ecopath with EcoSim project has been developed by long term assistance from DANIDA and with increasing links to the University of British Columbia, Canada. Management of the Caribbean Marine Protected Areas Project is being handled from the Caribbean/Eastern Pacific Office, with HQ serving for clearing and logistical support.

**Programmatic Links.** ICLARM collaborates with fisheries scientists working in developing countries, through National Aquatic Research Systems (NARS). There are over 1 500 registered users of FiSAT. To date more than 700 scientists in 75 countries have registered as users of the

Ecopath software. Also over 60 models of different aquatic ecosystems have been published through conference proceedings.

Most of the research results are disseminated through computer program routines the software of which is distributed freely. In most cases this is preceded by training courses. A good example relates to the dissemination of FiSAT. Both FAO and ICLARM conducted regional training courses that targeted NARS. This was sponsored by DANIDA over a 15 year span and was led by FAO.

The Ecopath with EcoSim model is being developed in very close cooperation with the Fisheries Center, University of British Columbia, Canada on an informal basis. Training workshops are being supported by the EU and FAO involving scientists from 40-50 institutions in some 30 countries.

Other courses that have been run under this program are for tropical fish resources ecology, dynamics and modeling, GIS, methods for analysis of fisheries resources, and fisheries, socioeconomics, management, policy and planning. Besides regional training courses and workshops ICLARM has an extensive publication record.

FRAMP is also linked with other ICLARM projects and programs. These include ReefBase, FishBase, fisheries co-management project, and the Valuation of Coral Reef Systems. The Caribbean activities are being carried out in cooperation with the Center for Marine Sciences, University of West Indies.

The coastal fisheries project is linked with WWF which is providing technical assistance in the MPA in Sulu-Sulawesi Seas. ADB funds a similar the coastal community development and fisheries management project in Indonesia, with which the ICLARM program is linked.

**Outputs and Impacts.** The main outputs are:

- FAO-ICLARM Stock Assessment Tools (FiSAT) including training and user support for the application of the softwares.
- Ecopath with EcoSim including training and user support for the application of the softwares.
- Caribbean Marine Protected Areas Project. The project has provided important information on fish migration out of MPAs and differences in recruitment levels between lightly fished and degraded areas.
- The coastal fisheries project has focused development of new software, consolidation of regional fishery resource information system and related documentation, and regional training workshops and their proceedings etc.
- The Solomon Islands Protected Areas Project shows that *trochus* is the first invertebrate species to respond to closure of the MPA but that other invertebrates recovery will only be measured after several years.
- Publications.

**Strategy and Priorities for the Future.** Interest in ecosystem management approaches is increasing worldwide. Through Ecopath with EcoSim, ICLARM has the opportunity to make an impact, in terms of policy development and increased understanding of how ecosystems function. It will continue to update its software and provide it free to scientists from developing countries. This will go hand in hand with relevant training. Work on MPAs will be a major contribution to the sustainability of coral reef, marine and freshwater fisheries.

#### 4.5 THE GERMPLASM ENHANCEMENT AND BREEDING PROGRAM (GEBP)

**Program Context.** The Germplasm Enhancement and Breeding Program (GEBP) was conceived in 1986 and started with research on the genetic and economic potential of tilapia for increased aquaculture production. The germplasm was collected directly from Africa, and from Africa via four Asian countries. The preliminary research findings were promising, and led to the establishment in 1988 of the project titled Genetic Improvement of Farmed Tilapia (GIFT), which lasted for 10 years. The project has now been taken over by the private sector through the non-profit GIFT Foundation, Inc. Traits under selection cover: growth rates, feed conversion, survival, disease resistance, tolerance to stress (salinity, poor water quality, temperature) etc. Genetic enhancement has been carried out in three different environments: ponds, cages, and rice fields.

An integral part of this program has been the transfer of the technology to a number of countries within Asia, and research on the impact of the germplasm on farmers in these countries. What is even more significant is that tilapia is now raised in ditches and ponds and rice fields by many poor farmers. To a large extent this is for their own consumption, with the surplus sold for cash.

##### **Projects and Networks managed within the Program.**

- Genetic improvement of carp in Asia. The GEBP has now expanded its genetic enhancement research from tilapia to farmed carps of Asia through the Genetic Improvement of Carps in Asia project focusing on the following areas: documentation of carp genetic resources, documentation of carp genetic improvement, socioeconomics of carp farming, consumption and genetics and carp genetic improvement. Several species including common carp, silver carp, silver barb, rohu, and catia are involved. This is a regional program covering Bangladesh, China, India, Indonesia, Thailand and Vietnam.
- Genetic improvement of farmed tilapias. This has been a very successful project based on the genetic improvement of Nile tilapia *Oreochromis niloticus*. Conceived in 1986, the research led to the initiation of the GIFT project in 1988. The project proved that genetic improvement of tropical fish is feasible. The project forms the basis for carrying out similar research in other developing countries with other species.
- Genetic Enhancement of Tilapia in Africa and West Asia. The Program has also expanded into Africa. Genetic characterization and selection of improved traits has been initiated in Egypt, Ghana, Ivory Coast and Malawi. This is based on the indigenous cichlids in Malawi and Nile tilapia in the other countries.

**Program Planning and Implementation.** The program was conceived in 1986 from ideas developed at various international fora. Following the success of the GIFT project subsequent projects have been with NARS partners through the International Network on Genetics in Aquaculture (INGA) - a forum for collaborative research and training in applied fish and breeding genetics. Besides other issues, INGA facilitates the exchange of information, methods, materials and ideas.

Areas for research are identified by national and international organizations through the INGA network. ICLARM provides assistance in the preparation of national research plans and assistance in the exchange of germplasm. This involves formulation of protocols and quarantine procedures and material transfer agreements.

**Programmatic Links.** The program is primarily linked with NARS in Asia and Africa through collaborative research and the INGA network. A project titled Dissemination and Evaluation of Genetically Improved Tilapia (DEGITA) was established after the success of the GIFT tilapia strain. Its main focus was to evaluate the performance of the GIFT tilapia on farms in the Philippines, Bangladesh, China, Thailand and Vietnam. The evaluation also covered socioeconomic analysis.

The International Network on Genetics in Aquaculture (INGA) was formed at the same time as DEGITA and was the vehicle for disseminating fish tried in DEGITA. INGA has 13 developing country members in Asia and Africa and 11 associate members of advanced research institutions worldwide. INGA exists to promote scientific research, collaboration, training and the exchange of germplasm.

Germplasm enhancement programs have been initiated with ICLARM staff at the Africa/West Asia research facilities (Central Laboratory for Aquaculture in Egypt, Water research institute in Ghana, University of Malawi in Malawi). The program has links with UNDP, the GIFT Foundation, the Central Luzon State University where the GIFT Foundation is based. UNDP and the Asian Development Bank have been major supporters of this program.

**Outputs and Impacts.** The main outputs and impacts are:

- The demonstration that there is variation of traits in fish which can be modified by genetic enhancement.
- The demonstration through the GIFT project that selective breeding of tropical fish can lead to the development of desired lines through the exploitation of a desired trait. The GIFT tilapia developed after seven generations of selection has led to increased productivity and profits on farms.
- The demonstration that some wild African strains grow better than domestic Asian strains, which had been bred without attention to genetic enhancement..
- The research carried out by ICLARM is having positive and significant impact in aquaculture in both Africa and West Asia.
- Increase in food security and profits on farms.
- Extension and training of NARS.
- Documentation.

**Strategy and Priorities for the Future.** Genetic enhancement is a continuous process. Future focus is on:

- Continued traditional selective breeding in Asia and increasing transfer of methods to Africa
- Developing monosex lines with genetic gains in growth and flesh quality. This will exploit the sexual domorphism in both carps and tilapias
- GEBP will evaluate programs that combine various combinations of selective breeding, monosex breeding, and gene transfer to produce the best fish for aquaculture
- Gene transfer. This has great promise for improving aquaculture traits of various fish, provided adequate attention is given to biosafety
- Genetic resources and population resources. This is important to get baseline data necessary for evaluating and monitoring any changes in the environment
- Impact assessments, and
- Environmental risk assessments.

#### 4.6 INTEGRATED AQUACULTURE-AGRICULTURE SYSTEMS PROGRAM (IAASP)

**Program Context.** The IAASP was established in 1996 and built upon the Integrated Resource Management (IRM) thrust of the former Inland Aquatic Resources Systems Program as defined by the 1992 strategic plan of ICLARM. After its establishment the focus of the program was widened to include small water bodies.

The program aims to improve access by rural and urban poor to low-cost protein through development and dissemination of small-scale aquaculture practices. It also aims at acquiring understanding of integrated aquaculture-agriculture systems so that they can be improved and better adapted to the needs of differing rural communities. The Program is based at headquarters but has several research sites in Asia and Southern Africa through which it collaborates with NARS.

**Projects and networks managed within the program.** These are:

- RESTORE project
- IAA in forest buffer zone management
- Sustainability indicators for IAA systems
- Deepwater rice-fish project in floodprone areas
- Malawi aquaculture project/IAA in Southern Africa
- Sustainable aquaculture in Bangladesh.

**Program Planning and Implementation.** Plans are made in consultation with management and are based on perceived global strategies and on an understanding of issues from a wide range of localities. An ICER was carried out on the IAASP in December 1997, and an ecoregionally based strategy has been developed.

**Programmatic Links.** The program works extensively with NARS and NGOs in collaborating countries. Contacts are maintained with the research sites in Bangladesh, Malawi and Vietnam mainly through e-mail and in upland Philippines through regular visits.

The program collaborates with IRRI. Informal contacts have been formalized through the deep-water rice-fish project. There are some contacts with one of the SWIM projects coordinated with IIMI and IFPRI. Contacts are also being sought with WARDA and IITA. The integrated approach to natural resources development and management is also of interest to ICRAF and collaboration between ICLARM (IAASP) and ICRAF to better integrate aquaculture into general rural cropping patterns should be expanded. The main donors to this program have been USAID and GTZ.

**Output and Impacts.** This program is oriented mainly towards development of practical and sustainable food production systems with enhanced capacity to produce fish. The integrated aquaculture/agriculture approach has the capacity to empower communities at both the farm and village level by creating new attitudes to the management of resources. It diversifies risk, income and diet and also increases the seasonal spread of food harvest.

Impacts from the individual project activities are:

- RESTORE Project: The main product from this project is a software package that incorporates a farm enterprise and household database. It uses this data to assess different types of aquaculture/agriculture system. There appears to be a fair demand for this package although the ICER for this program challenged its conceptual basis and recommended that ICLARM consider whether further investment in it is warranted. As a result of the ICER, ICLARM has upgraded

the analytical power of the package and in currently having it reviewed by a farming system specialist before deciding on its future support.

- IAA in forest buffer zone management: This project represents a specific application of the RESTORE approach to an agroforestry project.
- Sustainability indicators for IAA systems. This project consisted mainly of a masters thesis on a simulation model showing interaction of subsystems within a small Philippine farm.
- Deepwater rice-fish project. This is a new collaborative project developed with IRRI for floodprone ecosystems in Bangladesh and Vietnam.
- Malawi aquaculture project/IAA in Southern Africa. This project has developed an approach to integrated aquaculture development, which includes direct involvement of rural farmers in research. It has also defined extension methodologies and produced a series of scientific publications arising from its research. The project has had clear impacts on policy in Malawi as the Fisheries Department of the Government has now adopted its approach. It has strengthened the NARS and it maintains close links with Bunda College of the University of Malawi. Despite its small scale, the public goods nature of the approach to integrated aquaculture in this project is such that it has the potential to make a greater impact through its application over a wider geographic area.
- Sustainable aquaculture in Bangladesh. Project activities are being carried out in different ecoregions of the country for incorporating aquaculture into the farming systems for improved nutrition and poverty alleviation. The project has developed low-input, low-cost aquaculture practices and integrates farming systems that have been widely disseminated by NGOs and government agencies, leading to large scale adoption by small-scale farmers. Impact assessment of technologies developed by the project clearly indicated uptake of research results by a large number of farmers, increasing fish production by nearly five times, improved household consumption of fish, and higher incomes. The simple technologies developed have led to involvement of large numbers of women in aquaculture by the development agencies.

**Strategy and Priorities for the Future.** A new program strategy has been developed which will evaluate the practicability of IAA. This research plan for managed freshwater aquaculture will be related to ICLARM's own work as well as to that of others. The program will also survey, assess, compare and contrast selected cases of IAA in an endeavor to define what works where and why. To do this effectively it will seek wider collaboration with farming communities and existing facilities of other CGIAR Centers, ASIs and NARS.

#### 4.7 INTERNATIONAL PARTNERSHIPS AND NETWORKS PROGRAM (IPNP)

**Program Context.** The IPNP, established in 1996, has as its main aims to strengthen existing collaborations and develop new partnerships in research and related activities with NARS, NGOs, individuals/farmers/fishers in developing countries; advanced research institutions, and regional and international organizations. The program has one fulltime IRS and several NRS. IPNP is based at ICLARM headquarters. The Director, also being head of the International Relations Office (IRO), is a member of the Executive Management Team.

ICLARM relies on a collaborative mode of operation in carrying out its work. It has been undertaking research and conducting workshops/training programs in collaboration with relevant organizations and individuals since its inception. ICLARM management and staff have a partnership philosophy and view collaboration and partnering as a necessary condition for success in making its work relevant to the needs of its clients.

ICLARM also looks at its partnerships as one means of capacity building in developing country NARS. In view of the importance given in ICLARM to (1) strengthening the existing partnerships and forging new ones, especially with NARS from developing countries; and (2) coordinating international research and information networks, the Center created in 1996 the International Relations Office (IRO) and International Partnerships and Networks Program (IPNP).

**Projects and networks managed within the Program.** These include:

- Projects:
  - Dissemination and Evaluation of Genetically Improved Tilapia in Asia (DEGITA; 1994-97)
  - Genetic Improvement of Carp Species in Asia. (1997 – present)
  - Characterization and Documentation of Tilapia Species for Aquaculture in Africa (1997- present)
- Research Networks:
  - International Network on Genetics in Aquaculture (INGA) (1993- present)
  - Asian Fisheries Social Science Research Network (AFSSRN) (1983 -present)
- Information Network:
  - Network of Tropical Aquaculture and Fisheries Professionals (NTAFP) - formerly two separate networks, Network of Tropical Fisheries Scientists (NTFS) established in 1982, and Network of Tropical Aquaculture Scientists (NTAS) established in 1987.

The networks that the IPNP manages assist ICLARM scientists and the developing country NARS in developing partnerships in areas of strategic research, the results of which are available to every one interested. For example, INGA has been assisting developing country NARS in exchange of germplasm for research and development; provided assistance in development of national breeding plans; and training of developing country NARS, all of which are resulting in better management and implementation of research.

**Program Planning and Implementation.** Regional research priorities and training needs are identified through network planning meetings, for example the Steering Committee Meetings of INGA, which are held annually, and through correspondence with NARS, ARIs, regional and international organizations. Partnerships are identified based on the needs of various programs within ICLARM and the interest/needs of partner institutions in strategic research areas of ICLARM. Partners are also assisted in preparation of national plans, research proposals, identification of donors, etc. An ICER of the IPNP and the IRO, carried out in 1997, was appreciative of the partnerships the program had developed with NARS.

**Programmatic Links.** The program is based in headquarters, and it has links to most of the other programs through its network and capacity building activities. Links to ICLARM work in other regions are mainly through: networking activities; collaborative research projects; conferences/meetings/workshops/training programs; and regional fora.

The project has developed linkages with a number of non-ICLARM activities/organizations, both at national, regional and global level. Examples are:

- Network of Aquaculture Centers in Asia-Pacific (NACA)
- Food and Agriculture Organization of the United Nations (FAO)
- International Atomic Energy Agency (IAEA)
- Other CGIAR centers, e.g., IRRI and ISNAR

- Strategy for International Fisheries and Aquatic Research (SIFAR)
- CGIAR regional forum: Asia-Pacific Association of Agricultural Research Institutions (APAARI)
- Global Coral Reef Monitoring Network (GCRMN) sponsored by World Conservation Union, Intergovernmental Oceanographic Commission of UNESCO and UNEP.

Partnerships initiated through the program have led to: (i) identification and initiation of three regional projects: two for genetic improvement of aquaculture species in Asia and Africa and another for the management coastal stocks in Asia; (ii) ICLARM effectively assisting partners in exchange of germplasm for research and development; (iii) collaboration in genetics research with NARS and international organizations; (iv) generation of global interest in genetics network, as evidenced by 11 ARIs becoming Associate Members of INGA; (v) formation of a Fisheries Sub-group of the regional forum APAARI, etc.

**Outputs and Impacts.** The major outputs of the program are strengthened collaborations with NARS and ARIs through regional programs and networks. These are exemplified by the following:

- Development of ICLARM Policy on Partnerships in research and related activities;
- Development of policies for recruitment of young scientists from developing countries;
- Development of MOAs for joint teaching and research undertakings with universities;
- Successful completion of the regional project DEGITA;
- Development by INGA members of the Manila Resolution on: *Strengthening Partnerships to Advance the Science of Fish Breeding and Genetics and Development of National Fish Breeding Programs* to represent the member countries' support to the INGA activities during the Planning Meeting held in Manila, Philippines in 1997;
- Subsequent development of two collaborative regional research and training programs under INGA for the improvement of carps in Asia in which 6 countries are participating (Bangladesh, China, India, Indonesia, Thailand and Vietnam) and characterization and documentation of tilapia genetic resources for aquaculture enhancement in Africa in which 4 countries are participating (Côte d'Ivoire, Egypt, Ghana and Malawi);
- Initiation of National Fish Breeding Programs in Indonesia and Vietnam;
- Initiation of national networks for genetics research in member countries of INGA;
- Joining of 11 ARIs from Europe, USA, Australia and Japan as Associate Members of INGA;
- The merging of two information networks (NTAS and NTFS) into one network: Network of Tropical Aquaculture and Fisheries Professionals (NTAFP), with a membership of about 2,000 fisheries professionals;
- Training scientists from 13 INGA member countries in Quantitative Genetics and its Application in Aquaculture;
- Exchange of germplasm among partners;
- Bringing fisheries and aquatic resources management issues into the regional fora of CGIAR, starting with formation of Fisheries Subgroup in APAARI;
- Development of information database on ICLARM's partners in research and related activities;
- The program is ICLARM's contact point for NARS activities in the CGIAR and will be attempting to include a fisheries voice in the GFAR meeting in Bonn in 2000;
- Assistance to ICLARM programs developing new project activities with partner countries, e.g., in developing formal procedures for MOA's, contracts, and the most appropriate partner institutions, based on ICLARM experience and knowledge.



**Strategy and Priorities for the Future.** The Program plans to continue forming additional productive partnerships with NARS, ARIs, NGOs, the private sector and the developmental assistance agencies. The program will bring fisheries and aquatic resources management issues into the regional fora, which will enhance the value of networks. It is planned to start a Network of coastal resources management scientists in Africa, to bring together the social scientists and the biologists in the region for better management of coastal resources.

Training of NARS scientists from developing countries and their involvement in various projects will receive more attention. For example, in collaboration with ISNAR, the Program will be undertaking training programs for Asia-Pacific NARS partners in research priority setting for aquatic resource issues.

#### 4.8 INFORMATION AND TRAINING PROGRAM (ITP)

The Information and Training Program was formed in January 1996, upgrading its status and responsibilities as a result of an ICER conducted in December 1994. The Program has responsibility for information dissemination of ICLARM's research, information services to support the work of ICLARM staff and external users, public awareness, and training. The Program is headed by one fulltime IRS who also has primary responsibility for public awareness, and 15 NRS—eight in the Publications Unit and 7 in the Library and Information Services Unit.

**Program Context.** The development of a strategy for the ITP Program has been viewed as a high priority by both the ICER panel and the Board. The appointment in 1996 of a new Program Leader, with a background in marketing, added expertise to the already existing publishing and library capabilities. Although some individual projects have incorporated training activities, there is at present no single focal point for training in the Center. The ITP has experienced significant budget cuts over the past few years; positions have been combined or eliminated, and work has been contracted out.

In early 1997 a draft program Strategy was presented to the Board. It proposed that the work of ITP be more closely linked to projects from their conceptualization to the dissemination of results, and that the work of the individual ITP units be more closely integrated. The Board then requested the development of a full paper on ICLARM's approach and plans for training. Since then, several conceptual documents dealing with training have been prepared. The Board has approved, in principle, the thrust of a draft training strategy presented at its September 1998 meeting.

##### **Areas of responsibility within the ITP Program**

###### **> Information Dissemination: Publications Unit**

The Publications Unit has responsibility for disseminating the research results of ICLARM's scientists, and for supporting other publication needs of ICLARM. Additionally, the unit is responsible for generic publications on and of the Center such as *Naga* (the ICLARM Quarterly), annual report, operational plan, *Newsplash* (staff newsletter), Newsbriefs and ICLARM brochures. The Unit also supports internal and external presentations of Center staff, edits article submitted to refereed journals, supports placement of material on the ICLARM homepage, and handles photography, videography and other audiovisual requirements.

Staff reductions and natural turnover have allowed restructuring. At the same time, the workload has increased during the review period. More work is being outsourced and where appropriate, chargebacks are being made to projects and ICLARM offices. Project management has been

instituted, with clearly defined workflow charts, accountabilities and timelines. This has resulted in shortening production schedules for most publications, and reduction of backlogs (which had been significant just a few years ago). However, some publications have simply not been published due to lack of funding for production, printing and distribution. Since mid-1997 a two-tier pricing system has been instituted for the sale of publications, with the revenue returned to the general fund. The Unit is exploring alternative means of publishing, such as the in-house creation of CD-ROMS. Although recommended by the ICER, there is no active Publications Committee.

Budgetary constraints have resulted in creative responses to translation requirements, such as the development of a list server for translators in each of the CG centers, and tapping the use of websites for free translation services. A pool of commissioned translators is also being developed.

➤ Information Services: Library and Information Services Unit

The role of the Library and Information Services Unit (LISU) is to disseminate fisheries and related information through the provision of an information service. Its responsibility is to identify, collect, process, store, analyze and disseminate information relevant to the needs of the Center's management and staff, and to meet the information needs of external users.

The Unit has worked hard to maintain print and non-print materials, despite budget cuts, through creative and aggressive approaches. In 1996 LISU had 148 paid serial subscriptions; by 1998 this number had dropped by 63% to 55 paid titles. Beginning in 1997 LISU sought to offset the reduction in funding by charging back subscription costs to projects where appropriate, reducing the actual loss to 40% of paid titles. Similarly, an aggressive publications exchange program has been established, resulting in agreements with 144 libraries and related institutions.

The Library creates and maintains six databases to support its own and the Center's activities:

- LIBRI--bibliographic records of items in the collection
- NAGA--records of selected articles for inclusion in the ICLARM Quarterly *Naga*
- SERIE--records of serial titles holdings
- CITEANAL--records of citations to ICLARM publications
- PRESS--records of ICLARM press releases and incoming media mentions
- IMAGE--records of the slide/photo collection.

The Library databases are on the Local Area Network; and will be made available on the Internet when financial resources are available. As an initial step, the ICLARM Library Serials Holding List was uploaded to the ICLARM homepage in January 1998.

The LISU is visited most frequently by university students from Metro Manila, with the serials collection being the most heavily used. A Selective Fisheries Information Service (SFIS) provides in-depth information on research areas related to ICLARM's areas of expertise. Originally funded by IDRC, it is now supported by a combination of a two-tiered fee for service or an exchange of information. Since 1994 the number of requests filled annually has jumped 65% to 468 projected in 1998; of these, 79% are from developing countries. In 1997, when LISU began responding to the majority of inquiries via the Internet, there was an average increase in inquiries of 10 per month (a one-third increase). Although LISU does not offer a Selective Dissemination of Information (SDI) service, it does provide excellent broad-spectrum awareness through the listing of approximately 900 bibliographic items per year in *Naga*, through the distribution of a Serials Contents Pages Service to HQ, Bangladesh, Malawi, Egypt and the Solomon Islands staffs, and by posting a list of Selected New Acquisitions on ICLARM's homepage.

No data on inter-library loans or document delivery was provided to the Panel, but LISU has excellent linkages and cooperation with related organizations and other CGIAR centers. Examples of this include the exchange agreements mentioned previously, the inputting of ICLARM data to *Aquatic Sciences and Fisheries Abstracts*, and the data gathering and inputting of ICLARM and Philippine fisheries scientists' data to the Intergovernmental Oceanographic Commission's *Global Directory of Marine Scientists*.

A decision was made in July 1998 to discontinue the "Union Catalog of Fisheries Serial Holdings in Asia", a project begun by LISU in 1993. Limited funding and newer technologies such as e-mail, fax, or even the availability of mounting such information on the Internet make the project no longer as necessary as when it was begun. With severe budget limitations, the consulting and advisory services that had previously been offered by LISU staff have declined markedly, and training of library staff has ceased.

#### ➤ Public Awareness

The role of the public awareness function is "to initiate the marketing of ICLARM as a corporate entity, with a clearly defined mission, to ICLARM's four partner groups: donors (a priority audience), collaborators, the Board of Trustees, and clients (users and beneficiaries of ICLARM's research)". Following the 1994 ICER, a new program leader with a strong background in marketing has been appointed, and has the lead role in public awareness activities, along with her other responsibilities as ITP program leader.

All ICLARM staff have an important role in "selling" ICLARM to its various constituencies--through their own communications, interactions, and presentations. ITP assists them by preparing translations, handouts and presentation materials, by providing audiovisual services, and by editing materials and speeches. In addition, the Unit prepares press releases, facilitates interviews, contributes articles to the media, and prepares display materials for ICW. It also capitalizes on significant events such as ICLARM's 20th anniversary, participates in book fairs, is active in CGIAR system-wide public awareness activities, and recently developed a "Focus for Research" flyer series targeted at donors in order to encourage funding for strategic research and unrestricted core funds.

#### ➤ Training

The role of training in ICLARM to date has been primarily to extend the impact of specific research projects. Since 1995 the Board has been urging that more attention be given by ICLARM to training to take it further than an individual project and that a single training focal point be established in the Center. ITP has no funds in its budget for training.

Although ICLARM does not have an articulated, formal training plan that drives its training activities, it has given much thought to the issue and has in fact conducted a broad range of successful training activities over the past five years as listed in the ICLARM Annual Reports. The dissemination of results and capacity building with partners is recognized as an important complement to research; this view is incorporated in the ICLARM training documents.

During the past five years no consistent, consolidated record, by year has been systematically kept of the names, nationalities, gender and so forth of trainees or, consistently, the total number of people engaged in each type of activity. Retrospective information has been gathered, where available, at the Panel's request. We understand that this information will be more systematically gathered,

beginning with 1998 reporting, to be used eventually for compiling a database for record keeping, follow-up with trainees, and maintaining an "alumni" list.

#### 4.9 POLICY RESEARCH AND IMPACT ASSESSMENT PROGRAM (PRIAP)

**Program Context.** PRIAP was established in 1996 in response to previous reviews and evaluations which highlighted the need for ICLARM to strengthen and better integrate socioeconomic and policy research into its programs and to more systematically assess the impacts of its research and development efforts. It aims to: a) improve policies so that benefits of better management and production of aquatic resources accrue to the poorest sections of society; and b) help increase and sustain aquatic output in developing countries by providing proper measures for assessing research and development impact.

PRIAP has 18 professionals, including 11 in Manila and 7 in Bangladesh. Three are IRS and 15 NRS (presently one IRS position is vacant). In creating PRIAP, ICLARM opted to pool together social science expertise under one unit instead of deploying social scientists to its other programs. More than 70% of PRIAP's budget comes from restricted project funding.

Most PRIAP projects are designed with inputs from other ICLARM programs and external partner institutions. The PRIAP portfolio largely reflects ICLARM projects and staff commitments that pre-date the 1996 restructuring. Monitoring and assessment of these projects have been undertaken mostly in accordance with their respective donors' requirements. No CCER has been conducted on PRIAP.

**Projects included in PRIAP.** The program presently consists of 14 projects, including those undertaken in collaboration with ICLARM's other programs. These projects are most strongly aligned with CGIAR's activity category of improving policies, but also contribute in varying degree to improving productivity, protecting the environment, saving biodiversity and strengthening NARS. PRIAP's projects are grouped under three main thematic clusters:

- Ecological Economics for Sustainable Use of Aquatic Resource Systems. This thematic cluster encompasses ICLARM's multi-country fisheries co-management (CM) project, along with a component on legal and institutional analysis of coastal resources co-management. It also includes Bangladesh-specific policy research and institutional capacity building projects on user/community-based fisheries management (U/CBFM); and a two-year project on valuation of coral reef systems in the Philippines, which started in October 1997. The current phase of both the CM and U/CBFM projects is expected to end in early 1999; and both sets of projects have received donor commitments for follow-on work.
- Aquatic Resources Research Impact: Methods and Assessment. This thematic cluster involves the assessment of impact for completed major ICLARM projects, as well as the development of mechanisms for ex-ante and ongoing impact assessment for every major research initiative. The cluster initially consisted solely of a two-year project, which started in 1997, to determine the impact of ICLARM's research on giant clam farming in the Solomon Islands. Two additional projects were added in 1998: a two-year project to determine ex-post the socioeconomic impact of aquaculture extension on farming systems in two sub-districts of Bangladesh where ICLARM had implemented an aquaculture development and extension project in 1990-94; and a 21 month project to develop baseline data on the status and contribution of fisheries resources to household food security in the Mekong River Basin.

- Policy Analysis of the Contribution of Fisheries to Food Security. Under this theme, ICLARM hopes to examine a range of policy issues and measures by which governments strive to increase the supply of fish for human consumption and maximize economic benefits from the fisheries sector. In 1997, in collaboration with IFPRI, FAO and IFM, ICLARM conducted an international consultation workshop involving NARS, NGOs, policy makers and donors to identify issues, priorities and needs in fisheries policy research in developing countries. Two small projects under this thematic cluster have recently been completed: a project in southern Vietnam to strengthen educational, adaptive research and extension capacity in aquaculture; and a study to assess supply and availability of milkfish fry in the Philippines. ICLARM was requested to take part in the milkfish fry study by the Philippines authorities who also provided some funds. Two new projects are in the pipeline; project proposals for the assessment and monitoring of supply and demand for fish and seafood products in Asia and Africa have been submitted for possible funding from donors interested in these regions. These studies will feed into a larger project to create a database for policy analysis in developing countries, particularly for use in projections, trend forecasting, and research and development priority setting.

**Future Program Priorities.** PRIAP's future priorities and strategies follow the recommendations of the 1997 consultation and build on past and on-going projects. PRIAP would undertake research on six of ten priority topics identified during the 1997 consultation, including:

- Economic valuation of fisheries within an integrated framework of resource management
- Sustainable governance of fisheries
- Integrating aquatic resources into the world food supply and demand model
- Employment and labor flows in fisheries and their effects on income and food security
- Trade and market liberalization policies affecting fish production and distribution
- Policies to support integrated aquaculture-agriculture systems.

During the next MTP period, PRIAP plans to implement an ambitious program of research at different levels: fisheries co-management (CM); national (Bangladesh U/CBFM); regional (Mekong River Basin food security study); cross regional (Asia and Africa database, fish and seafood supply and demand); and global (including the appropriate measurement of fish in the IFPRI food supply and demand model). Besides implementing its own research, PRIAP will link with and provide socioeconomic inputs to ICLARM's other programs.

**Cross-Program Linkages and External Collaboration.** PRIAP staff are currently involved in collaborative activities with a number of ICLARM programs. They are responsible for socioeconomic analysis in FRAMP's coastal fisheries project, and expect to be involved in impact assessment in AEP's proposed project on improving policies for the sustainable management of coral reefs. In addition, PRIAP staff assist GEBP and IAASP with studies related to ex-ante evaluation of genetic research and culture-based fisheries in flood-prone ecosystems, respectively.

PRIAP also maintains formal and informal partnerships with NARS and NGOs as well as links with non-ICLARM projects in the Philippines, Indonesia, Thailand, Laos, Vietnam, Cambodia, Bangladesh and Denmark. In addition, PRIAP participates in the CGIAR system-wide initiatives on Property Rights and Collective Action and Participatory Research and Gender Analysis. In June 1999, ICLARM will be hosting a workshop on this initiative.

Activities involving PRIAP staff are being implemented both at headquarters and in a number of outreach sites. As projects in other programs' pipelines become operational, in-house demand for PRIAP's support services is expected to increase.

**Outputs and Impacts.** PRIAP's major program outputs since its inception include two workshops it organized in 1997. The first was an in-house workshop which recommended comprehensive guidelines for monitoring, evaluation and impact assessment of multi-country, multi-site projects. These guidelines are now used by all ICLARM projects. PRIAP has built on this to develop an impact assessment framework for ICLARM. The second workshop was the international consultation on policy research which significantly shaped PRIAP's future research agenda, and produced policy briefing papers calling attention to linkages between fisheries, poverty and food security.

Other significant outputs stem from components of projects which predated PRIAP, notably the CM and U/CBFM projects. Tangible products from both sets of projects include journal articles, technical reports, workshop proceedings, policy briefing papers, training materials, case studies, newsletters and databases. Less tangible outputs include the creation of formal and informal networks of partner institutions, varying degree of NARS capacity building, and demonstration and testing of analytical tools and approaches to collective fisheries management. It is difficult to ascertain the impacts of these outputs and to separately assess ICLARM's own impact because of the collaborative and integrated nature of these projects. However, there is evidence of positive outcomes and potential impacts.

Citations of CM publications indicate the project's contribution to international fisheries management research. The framework for institutional analysis and the manual on rapid appraisal of fisheries management system have been employed beyond CM project areas. Dissemination of research findings through international conferences and networks of collaborating institutions appear to have contributed to increasingly realistic consideration by researchers and NGOs of the potentials and limitations of CM as a strategy for local management of marine protected areas and coastal zones. This could be a particularly significant contribution in the context of broader global resource governance debates around decentralization and devolution of management of natural resources, including fisheries.

The U/CBFM project had a major role in reshaping the terms of the national debate on inland fisheries management policy in Bangladesh and in influencing the design and implementation of larger, externally-funded fisheries programs of the government. Recommendations from project-organized policy workshops have fed into the government's efforts to revise national policy. Incorporation of U/CBFM approaches into larger programs offers the possibility of multiplying and scaling up the project's impacts over the long-term. While these outcomes can not be attributed to ICLARM alone, ICLARM's research facilitation, capacity building efforts and credibility as an international organization have been key to achieving these positive changes. U/CBFM partner institutions are increasingly linked with the larger ICLARM CM network and participate more actively in international conferences and, in the process, disseminate project results and findings more widely. Lessons and approaches from Bangladesh are now beginning to be applied in other countries.

**Appendix V-A. International Center for Living Aquatic Resources Management  
Board Composition (1993-1998)**

Name	Nationality	Specialization	Gender	Nominated by	93	94	95	96	97	98	Positions Held
Ayala-Castañares, Agustin	Mexico	Oceanography	M	Board	x						M-PC; M-NC
Gomez, Edgardo	Philippines	Marine Biology	M	Board	x						M-PC
Muller, David	Western Samoa	Hydrology	M	Board	x						M-PC
Nauen, Cornelia	Germany	Fisheries	F	Board	x						M-NC
Stifel, Laurence	United States	Economics	M	DG	x						M-EC; M-PC
Alverson, Dayton	United States	Fisheries	M	Board	x	x					M-EC; N-FMC; M-PC
Kadzamira, Zimani	Malawi	Social Science	M	Board	x	x					M-EC; M-FMC; C-NC
Filshie, Barry	Australia	Physics	M	Board	x	x	x				M-EC; C-FMC
Satia, Benedict	Cameroon	Aquaculture	M	Board	x	x	x				C-PC; M-EC
Sebastian, Roberto	Philippines	Agricultural Economics	M	Host Govt.	x	x	x	x			M-EC; MFMC
McGlade, Jacqueline	Canada	Zoology	F	Board	x	x	x	x			M-PC
Mikkelsen, Britha	Denmark	Social Science	F	Board	x	x	x	x			C-NC
Brady, Nyle	United States	Soil Science	M	Board	x	x	x	x	x		V-BOT; M-EC; C-PC
Fujiya, Masaru	Japan	Fisheries	M	Board	x	x	x	x	x		M-PC
Shariff, Mohamed	Malaysia	Fisheries Science	M	CGIAR		x	x	x	x	x	C-NC; M-AC
Dillon, John	Australia	Agricultural Economics	M	CGIAR	x	x	x	x	x	x	C-BOT V-BOT; M-EC; M-NC; M-PC
Garcia, Serge	France	Fish Science	M	FAO Rep.	x	x	x	x	x	x	M-PC
Williams, Meryl	Australia	Marine Biology	F	DG		x	x	x	x	x	M-EC; M-PC
Peters, Kurt	Germany	Agricultural Science	M	CGIAR			x	x	x	x	C-BOT; C-EC; M-AC; M-PC; M-NC
Muthiga, Nyawira	Kenya	Marine Science	F	Board				x	x	x	M-AC
Bortei-Doku Aryectey, Ellen	Ghana	Social Science	F	Board					x	x	M-PC; M-NC
Escudero, Salvador III	Philippines	Veterinary Med.	M	Member Co				x	x		M-EC
Joshi, Joan	United States	Management	F	Board					x	x	C-AC; M-EC
Soegiarto, Aprilani	Indonesia	Marine Science	M	Board					x	x	C-PC
Hassan Khalil, Yehia	Egypt	Food Science Fisheries	M	Host Govt.					x		M-EC
Richardson, Katherine	United States (Denmark resid.)	Marine Science	F	Board						x	M-PC
Dar William	Philippines	Agriculture	M	Member Co						x	M-EC
Nose, Takeshi	Japan	Aquaculture	M	Board						x	M-PC

**Appendix V-B. Profile of International Staff - 1995 and 1998**

	1995		1998	
	Male	Female	Male	Female
<b>Total Number of IRS</b>	<b>21</b>	<b>2</b>	<b>26</b>	<b>4*</b>
<b>Staffing by Level</b>				
Management	4	1	4	1
Scientists	16	1	21	2
Ass. Experts	1*		1*	1*
<b>Staffing by Age</b>				
20-30			1*	
31-40	9*	1	3	2*
41-50	7	1	14	1
51-60	5		8	
Over 60			1	
<b>Nationality</b>				
Asia/Oceania	6	1	4	1
Latin America/Caribbean				
Africa and Middle East (incl. SSA and WANA)			1	
North America	5		5	
Europe	8*		13*	1*
Australia/New Zealand	2	1	3	2
Japan				
<b>Tenure at Center (number of year)</b>				
Less than 1 year	2		1	
1-3 years	4	1	12*	2*
4-5 years	4*		2	1
More than 5 years	11	1	11	1
<b>Location/Posting</b>				
Headquarters	17*	2	17*	4*
Outposted (regional or field location)	4	0	9	0
<b>Discipline in which highest degree received</b>				
Aquaculture	2		5	
Biology	11	2	13*	2
Chemistry	1		1	
Computer science				
Economics	4*		4	
Mathematics				
Statistics				
Social Science	1		2	1*
Management/administration	1		1	1
Others	1			

\* includes Associate Experts



**DOCUMENTS PROVIDED BY ICLARM TO THE REVIEW PANEL**

1. Report of the First ICLARM External Program and Management Review, 1992
2. ICER Report, Integrated Resources Management Thrust, 1993
3. ICER Report, Coastal and Coral Reef Resources System Program, 1994
4. Report of the ICLARM Mid Term Review, 1995
5. ICER, Corporate Services, 1993, 1994, 1995
6. ICER, ICLARM Board, 1996
7. ICER, External Review of the CGIAR Genebank Operations, 1996
8. Summary Findings of the External Advisory Panel, Tripartite Review of the Genetic Improvement of Farmed Tilapias (GIFT) Project, 1996
9. ICER, Program Structure, International Relations Office and External Relations, 1997
10. ICER, Integrated Aquaculture-Agriculture Systems Program, 1997
11. ICER, Aquatic Environments Program, 1998
12. ICER, Giant Clam and other ACIAR-funded Coastal Aquaculture Research, 1998
13. ICER, Information Division, 1994
14. ICLARM 1997 Annual Report
15. ICLARM 1998 Operational Plan
16. ICLARM 1999-2001 Medium Term Plan
17. Internally-Commissioned External Reviews (ICERs) and Other Reviews: Progress List
18. ICLARM Structure and Governance, 1998
19. BoT Composition 1993 onwards
20. ICLARM Board and Center Policy Manuals and Guidelines and particularly
  - Guidelines for the Planning, Implementation and Evaluation of Programs and Projects, 1998
  - Accounting and Finance Unit: Policies and Procedures Manual (1993)
  - Financial Information Manual, 1996
  - ICLARM Codes of Conduct
  - Staff Performance Management Program, 1994 revised 1997
  - Position and Salary Structure, 1998
21. Paper on main achievements and impacts of Center's program
22. Full list of all ICLARM papers published since last EPMR
23. ICLARM's history in the world of fisheries, evolution of ICLARM, its mandate and strategy, partnerships, donors, major issues and constraints
24. ICLARM Board SWOT analysis (1995/1998)
25. 1997/1998 Staff attitude surveys and reports
26. ICLARM Summary of actions taken on 1<sup>st</sup> EPMR and Mid Term Review
27. ICLARM's latest list of currently-funded projects/List of proposals submitted and in preparation
28. ICLARM's Program descriptions
29. ICLARM's Corporate Services Division (CSD) functions
30. Staff time and allocation (IRS and NRS)
31. Process of DG Evaluation
32. Abbassa Expenditures for 1997 and 1998 Operational and Capital
33. Copy of staff attitude survey questionnaire and detailed results
34. An analysis by categories and rank of NRS by gender and geographic location for the past 2-3 years with similar separate analysis for "professional staff"
35. Balance sheet and income statement and capital budget for the years 1997, 1998 and 1999

36. Interactions among programs:
  - Program inputs into other programs (as the program and activity level)
  - Cross linkages among staff and programs
  - Disciplines by programs (disciplines of staff assigned to each program)
37. Additional response to the Mid Term Review
38. Authorship of ICLARM publications by NARS partners.
39. Information on ICLARM's training programs.
40. ICLARM Priority Setting Process
41. ICLARM Draft Strategic Plan 2000-2020

## APPENDIX VII. GLOSSARY OF ACRONYMS

ACIAR	Australian Centre for International Agricultural Research
ADB	Asian Development Bank
ADG	Associate Director General
AEP	Aquatic Environments Program
AfDB	African Development Bank
AFRENA	Agroforestry Research Network for Africa
AFSSRN	Asian Fisheries Social Science Research Network
ALCOM	Aquaculture for Local Community Development
APAARI	Asia-Pacific Association of Agricultural Research Institutes
AQD	Aquaculture Department
ARIs	Advance Research Institute
BFAR	Bureau of Fisheries and Aquatic Resources
BGRP	Biodiversity and Genetic Resources Program
BMZ	Bundesministerium für Wirtschaftliche Zusammenarbeit
CAC	Coastal Aquaculture Centre
CASEP	Coastal Aquaculture and Stock Enhancement Programme
CBD	Convention on Biological Diversity
CCERs	Centre-Commissioned External Reviews
CGIAR	Consultative Group on International Agricultural Research
CIFA	Committee for Inland Fisheries of Africa
CIFOR	Center for International Forestry Research
CLAR	Central Laboratory for Aquaculture Research
CLSU	Central Luzon State University
CM	Co-management
CMTF	Coastal Management Training Project
DANIDA	Danish International Development Assistance
DDG	Deputy Director General
DEGITA	Dissemination and Evaluation of Genetically Improved Tilapia Species in Asia
DFID	Department for International Development
ELEFAN	Electronic Length Frequency Analysis
EMT	Executive Management Team
EPMR	External Programme Management Review
FAC	Freshwater Aquaculture Center

FAO	Food and Agriculture Organization of the United Nations
FISAT	FAO-ICLARM Stock Assessment Tools
FRAMP	Fisheries Resources Assessment and Management Program
GBF	Global Biodiversity Forum
GCRMN	Global Coral Reef Monitoring Network
GEBP	Germplasm Enhancement and Breeding Program
GhRRM	Ghana Rural Reconstruction Movement
GICOR	Global Inventory of Coral Reefs
GIFT	Genetically Improved Farmed Tilapias
GIS	Geographical Information System
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
HRU	Human Resources Unit
IAA	Integrated Agriculture-Aquaculture
IAASP	Integrated Aquaculture-Agriculture Systems Program
IAEA	International Atomic Energy Agency
IARC	International Agricultural Research Center
IBSRAM	International Board for Soil Research and Management
ICER	Internally Commissioned External Reviews
ICLARM	International Center for Living Aquatic Resources Management
ICRAF	International Centre for Research in Agroforestry
ICRAN	International Coral Reef Action Network
ICRI	International Coral Reef Initiative
IDAF	Integrated Development of Artisanal Fisheries
IFM	Institute of Fisheries Management and Coastal Community Development
IFPRI	International Food Policy Research Institute
IIMI	International Irrigation Management Institute
IIRR	International Institute for Rural Reconstruction
IITA	International Institute of Tropical Agriculture
ILRI	International Livestock Research Institute
INGA	International Network on Genetics in Aquaculture
IPGRI	International Plant Genetic Resources Institute
IPG	International Public Goods
IPNP	International Partnerships and Networks Program
IPR	Intellectual Property Rights
IRO	International Relations Office
IRRI	International Rice Research Institute
IRS	International Recruited Staff
ITP	Information and Training Program
IUCN	International Union for Conservation of Nature and Natural Resources
IVDN	Integrated Voice Data Network

IWMI	International Water Management Institute
LAC	Latin America and the Caribbean
LAR	Living Aquatic Resources
LARM	Living Aquatic Resources Management
LFSA	Length-Frequency Stock Assessment
LISU	Library and Information Services Unit
MOA	Memorandum of Agreement
MPA	Marine Protected Area
MTP	Medium-term Plan
MTR	Mid-Term Review
NACA	Network of Aquaculture Centres in Asia-Pacific
NARS	National Aquatic Research Systems
NASA	National Aeronautics and Space Administration (USA)
NFFRT	National Freshwater Fisheries Research and Training Center
NGO	Non-Governmental Organization
NIWA (New Zealand)	National Institute of Water and Atmospheric Research
NOAA	National Oceanic and Atmospheric Administration
NRS	Nationally Recruited Staff
NTAFP	Network of Tropical Aquaculture and Fisheries Professional
NTAS	Network of Tropical Aquaculture Scientists
NTFS	Network of Tropical Fisheries Scientists
OFCF (Japan)	Overseas Fishery Cooperation Foundation
PCAMRD	Philippine Council for Aquatic and Marine Research and Development
PCE	Population, Consumption and Environment
PISCES	Population Interdependencies in the South China Sea Ecosystems
PRIAP	Policy Research and Impact Assessment Program
R&D	Research and Development
RAMP	Rapid Assessment of Management Parameters
RETA	Regional Technical Assistance
RESTORE	Research Tool for Natural Resource Management, Monitoring and Evaluation
SADC	Southern African Development Community
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice
SDI	Selective Dissemination of Information
SEAFDEC	Southeast Asian Fisheries Development Center
SFIS	Selective Fisheries Information Service
SGRP	System-wide Genetic Resources Programme

SIFR	Study of International Fisheries Research
SINGER	System-wide Information Network for Genetic Resources
SPC	South Pacific Commission
SSA	Sub-Saharan Africa
SWIM	System-wide Initiative on Water Management
SWP	State Water Project
TAC	Technical Advisory Committee
TCP	Technical Cooperation Programme
U/CBFM	User/Community-based Fisheries Management
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UPV	University of the Philippines in the Visayas
WANA	West Asia-North Africa
WARDA	West African Rice Development Association
WCMC	World Conservation Monitoring Centre
WRI	World Resources Institute